The NATIONAL GEOGRAPHIC MAGAZINE

Vol. XVII AUGUST, 1906 No. 8

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THE NATIONAL GEOGRAPHIC MAGAZINE

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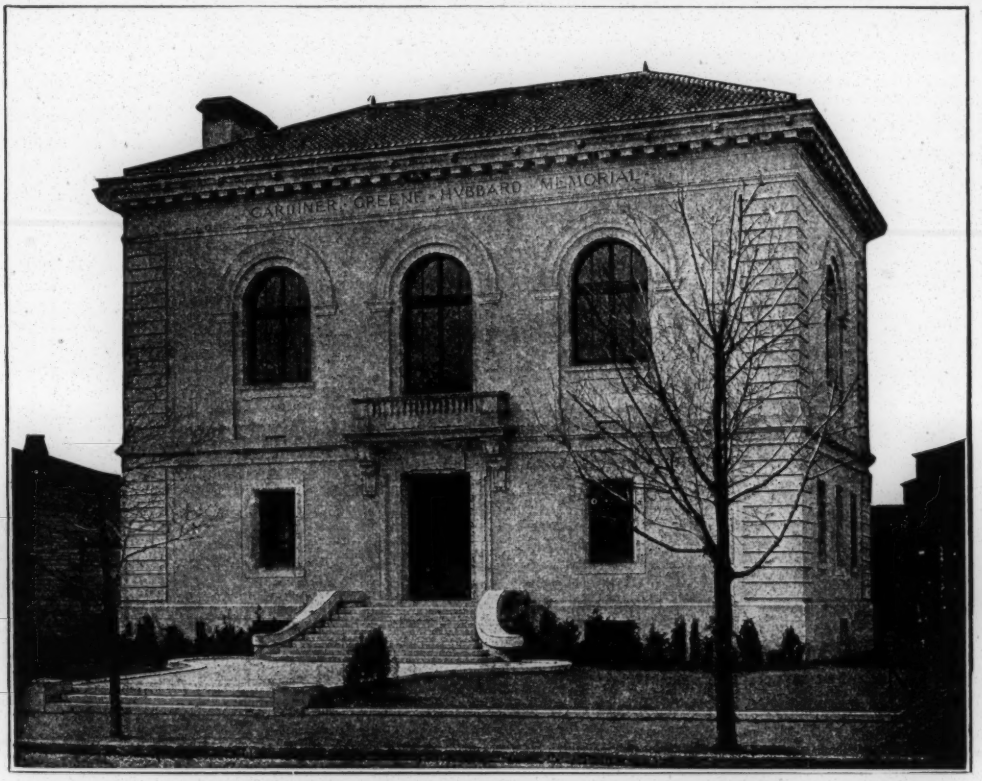

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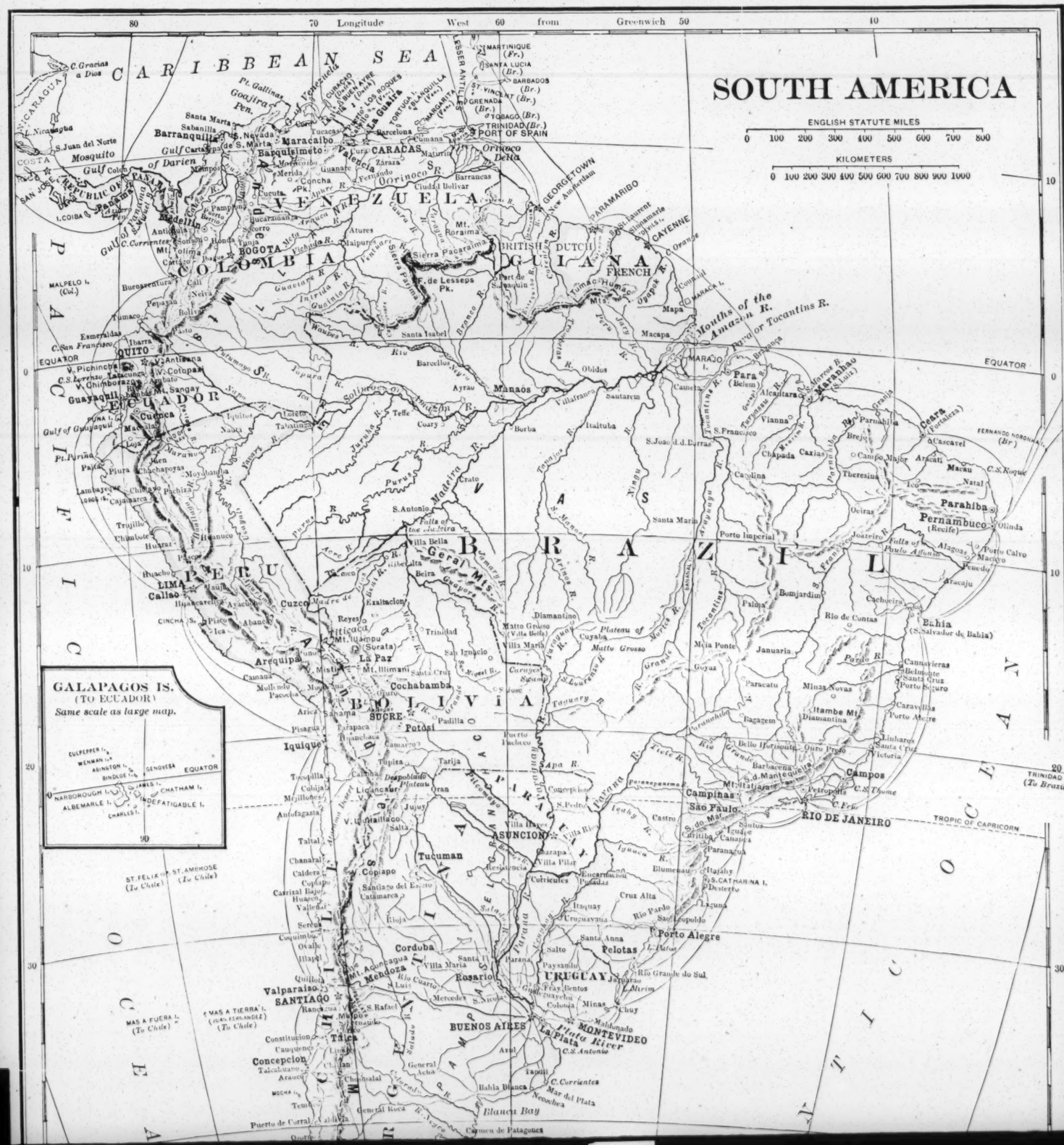
SUPPLEMENT TO THE NATIONAL GEOGRAPHIC MAGAZINE

(WASHINGTON, D. C.), AUGUST, 1906



COUNTRIES

ARGENTINA.—Principal products: Wheat corn, cattle, sheep and wool; the cattle and sheep entering in commerce in the form of meats exported chiefly to Europe in cold storage. Number of miles of railway according to the latest information, 11,460. Imports, 1904, $180,750,000; exports, $254,912,000. Area, 1,135,840 square miles; population, 4,794,000.

BOLIVIA.—Principal products: Wheat, corn, coffee, sugar, rubber, cinchona, cattle, sheep and llamas, the latter being used for purposes of transportation as well as for their wool. Miles of railway about 760. Imports, $6,407,000; exports, $10,157,000. Area, 703,604 square miles; population, 1,816,000.

BRAZIL.—Principal products: Coffee, India rubber, tobacco, cotton, sugar, mate (Paraguay tea), cocoa and nuts. The diamond mines produce from $500,000 to $1,000,000 worth of diamonds annually. Railways open at latest reports, 10,408 miles, with about 4,000 miles in process of construction. Imports, 1904, $129,930,000; exports, $191,849,000. Area, 3,219,000 square miles; population, 14,334,000.

CHILE.—Principal products: Wheat, corn, wine, fruits, vegetables and products of the mine, especially copper, sulphur and nitrates, the value of nitrates exported being between $40,000,000 and $51,000,000 annually. Railways, 2,880 miles. Imports, $52,002,000; exports, $70,912,000. Area, 307,620 square miles; population, 2,712,145.

COLOMBIA.—Principal products: Wheat, corn, India rubber, tobacco, dye woods and products of the mine. Railways, about 500 miles. Imports, $14,453,000; exports, $12,658,000. Area, 504,773 square miles; population, estimated at about 4,000,000 (no census since 1881).

EQUADOR.—Principal products: Cocoa, coffee, Brazil nuts, cotton, Peruvian bark, sarsaparilla, India rubber, gold, silver and copper. Railways, 186 miles. Imports, $7,469,000; exports, $11,642,000. Area, 116,000 square miles; population, including Indians, about 1,400,000.

GUIANA, BRITISH.—Principal products: Sugar and products of the mine, chiefly gold. Railways in operation, 104 miles. Imports, $8,000,000; exports, $8,808,000. Area, 90,500 square miles; population, at last census, 278,328.

GUIANA, DUTCH.—Principal products: Sugar, corn, coffee, cocoa, rice, molasses and rum. Imports, $2,400,000; exports, $1,600,000. Area, 46,060 square miles; population, 72,295.

GUIANA, FRENCH.—Principal products: Rice, corn, cocoa, coffee, sugar, indigo, tobacco, gold, silver and phosphates. Imports, $2,500,000; exports, $2,400,000. Area, 30,500 square miles; population, 32,900.

PARAGUAY.—Principal products: Cattle, horses, sheep, tobacco, yerba mate (or Paraguay tea), coffee, oranges and fruits. Railways, 156 miles. Imports, $3,441,000; exports, $3,077,000. Area, 157,000 square miles; population, 636,000.

PERU.—Principal products: Cotton, sugar, cocoa, coffee, tobacco, wines, olives, cinchona, wheat, corn, ramie, gold, silver and other minerals. Railways, 1,146 miles. Imports, $20,916,000; exports, $19,790,000. Area, 690,733 square miles; population, 4,610,000 (estimated).

URUGUAY.—Principal products: Wheat, corn, cattle, horses, sheep, wool, wine, tobacco, gold, silver and coal. Railways, 1,210 miles. Imports, $21,938,000; exports, $39,764,000. Area, 72,210 square miles; population, 978,000.

VENEZUELA.—Principal products: Sugar, coffee, cocoa, corn

XUM

GALAPAGOS IS.
(TO ECUADOR)
Same scale as large map.
EQUATOR
CULPEPPER I.
WENMAN I.
ABINGTON I.
BINDLOE I.
GENOVESA
NARBOROUGH I.
ALBEMARLE I.
CHARLES I.
JAMES I.
CHATHAM I.
INDEFATIGABLE I.
Hammond's 8 x 11 Map of South America.
C.S.Hammond & Co., New York.
ATLANTIC OCEAN
PACIFIC OCEAN
ECUADOR
PERU
BOLIVIA
BRAZIL
PARAGUAY
URUGUAY
CHILE
ARGENTINA
QUITO
LIMA
Callao
Cuzco
Arequipa
La Paz
SUCRE
Potosi
Cochabamba
Iquique
Tucuman
ASUNCION
Corduba
Rosario
Mendoza
SANTIAGO
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Bahia
(S.Salvador de Bahia)
Manaos
Para
(Belem)
Maranhao
(S.Luis)
Ceara
(Fortaleza)
Natal
Macau
Aracaju
Maceio
Olinda
Porto Calvo
Penedo
Campos
Petropolis
Itambe Mt.
Diamantina
Ouro Preto
Barbacena
Caravellas
Porto Seguro
Ilheos
Victoria
Linhares
Santa Cruz
Porto Alegre
Pelotas
Rio Grande do Sul
Paranagua
Curitiba
Castro
Ponta Grossa
Itajahy
Blumenau
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Desterro
Laguna
Encarnacion
Posadas
Corrientes
Concepcion
Villa Rica
Villa Real
Villa Pilar
Itaquy
Cruz Alta
Rio Pardo
Sao Leopoldo
Santa Anna
Salto
Paysandu
Fray Bentos
Colonia
Minas
Maldonado
Chuy
L.Merim
L.Patos
Jaguarao
Rio Grande
Bahia Blanca
Carmen de Patagones
Viedma
Rawson
Puerto Madryn
Valdes Pen.
S.Matias Gulf
Gulf of St.George
Gulf of Penas
Puerto Deseado
C.Tres Puntas
C.Virgin
Strait of Magellan
Falkland Sound
Port Stanley
FALKLAND IS.
(Br.)
EAST I.
WEST I.
TIERRA DEL FUEGO
Mt.Darwin
Cape Horn
Punta Arenas
Santa Cruz
Grande Bay
Port Famine
Possession Bay
SOUTH GEORGIA
(Br.)
CLERKE ROCKS
SHAG ROCKS
STATEN I.
NAVARIN I.
WOLLASTON IS.
HOSTE I.
DIEGO RAMIREZ IS.
SANTA INES I.
CLARENCE I.
HANOVER I.
QUEEN ADELAIDE ARCH.
DESOLATION I.
MADRE DE DIOS I.
WELLINGTON I.
CAMPANA I.
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GUAITECAS IS.
CHONOS ARCH.
MOCHA I.
PUNA I.
Gulf of Guayaquil
Guayaquil
Cuenca
Chimborazo
Cotopaxi
Antisana
Pichincha
Esmeraldas
Ibarra
Tumaco
Payasan
Bolivar
Pasto
C.San Francisco
C.S.Lorenzo
Latacunga
Ambato
Mt.Sangay
Iquitos
Nauta
Tabatinga
Teffe
Coary
Ayrao
Barcellos
Borba
Itaituba
Tapajos R.
Villafranca
Santarem
Obidos
Macapa
Mouths of the Amazon R.
Mouth or Tocantins R.
MARAJO I.
Caneta
Vianna
Alcantara
Parnahiba
Brejo
Cascavel
Campo Major
Aracati
Theresina
Caxias
Chapada
Carolina
S.Francisco
S.Joao d.d.Barras
Santa Maria
Porto Imperial
Ociras
Joazeiro
Falls of Paulo Affonso
Bomjardim
Palma
Cachoeira
Rio de Contas
Jacobina
Januaria
Mocha Ponte
Goyaz
Paracatu
Minas Novas
Pardo R.
Cannavieras
Belmonte
Santa Cruz
Porto Seguro
Diamantino
Matto Grosso
(Villa Bella)
Villa Maria
Cuyaba
Plateau of Matto Grosso
Falls of the Madeira
Villa Bella
Geral Mts.
Beira
Exaltacion
Reyes
Trinidad
San Ignacio
Santa Cruz
Curuyes
Sgando
Jose
Concepcion
Pedro
Tapiza
Tarija
Cinti R.
Despoblado Plateau
Licancaur
Oran
Jujuy
Salta
Cafayate
Tolombon
Chanaral
Caldera
Copiapo
Carrizal Bajo
Huasco
Vallenar
Serena
Coquimbo
Ovalle
Illapel
Quillota
Valparaiso
Mt.Aconcagua
Rio Cuarto
Villa Maria
Santa Fe
Parana
Rio Salado
Rio Colorado
Mercedes
S.Nicolas
S.Rafael
Mendoza
Rancagua
Maipo
Constitucion
Cauquenes
Chillan
Talcahuano
Arauco
Concepcion
Lebu
Imperial
Chimbalal
General Acha
Axel
Tandil
C.Corrientes
Necochea
Mar del Plata
Blanca Bay
General Roca
Puerto de Corral
Valdivia
Ancud
Puerto Montt
Osorno
El Tronador
L.Nahuel Huapi
Puerto Madryn
Chubut R.
Rio Negro
Colorado R.
Rio Quinto
Rio Segundo
Rio Primero
Rio Dulce
Rio Salado
Rio Paraguay
Rio Parana
Rio Uruguay
Rio Iguassu
Rio Tiete
Rio Grande
Rio Paranahiba
Rio Tocantins
Rio Araguaya
Rio Xingu
Rio Tapajos
Rio Madeira
Rio Purus
Rio Jurua
Rio Javary
Rio Solimoes
Rio Negro
Rio Branco
Rio Trombetas
Rio Nhamunda
Rio Jamundas
Rio Maecuru
Rio Paru
Rio Jary
Rio Gurupy
Rio Guama
Rio Capim
Rio Moju
Rio Acara
Rio Itapicuru
Rio Parnahiba
Rio Gurgueia
Rio Preto
Rio Grande
Rio Corrente
Rio Paraguassu
Rio Jequitinhonha
Rio Doce
Rio Pardo
Rio Mucury
Rio Itabapoana
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Rio Uaupes
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Rio Caura
Rio Paragua
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Rio Yuruari
Rio Cuchivero
Rio Aro
Rio Portuguesa
Rio Apure
Rio Arauca
Rio Meta
Rio Guaviare
Rio Inirida
Rio Vaupes
Rio Tiquie
Rio Isana
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Rio Gurupy
Rio Jary
Rio Paru
Rio Maecuru
Rio Jamundas
Rio Nhamunda
Rio Trombetas
Rio Branco
Rio Solimoes
Rio Javary
Rio Jurua
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Rio Purus
Rio Xingu
Rio Araguaya
Rio Tocantins
Rio Grande
Rio Paranahiba
Rio Parana
Rio Uruguay
Rio Iguassu
Rio Tiete

VOL. XVII, NO. 8 WASHINGTON AUGUST, 1906

THE NATIONAL GEOGRAPHIC MAGAZINE

SOUTH AMERICA FIFTY YEARS HENCE

BY CHARLES M. PEPPER

AUTHOR OF "PANAMA TO PATAGONIA," "TOMORROW IN CUBA," ETC., MEMBER OF PERMANENT PAN-AMERICAN RAILWAY COMMITTEE

IN the first Pan-American Conference, which was held in Washington in 1890, one of the most eminent of the delegates from Latin America declared that the 20th century would belong to South America, just as the 19th century had belonged to the United States. This sentiment will be re-echoed by the Third Pan-American Conference during the sessions at Rio Janeiro. In the meantime Canada has come forward with rapid strides, and Premier Laurier asserts that the 20th century belongs to Canada.

In the opinion of many people in the United States, though they know almost as little of Canada as of South America—that is, of the splendid domain which stretches from the maritime provinces to the Pacific and the regions of the Yukon—the Dominion has the better claim. But it is not necessary to quarrel with either prophecy. Both have vast possibilities.

With regard to South America, it may still be difficult to convince North Americans that this continent, whose area comes within a fraction of equaling North America, has a future which should not be measured by the past; or that fifty years hence it will not continue to be the region best known to the rest of the world as the seat of earthquakes and revolutions. There is no need to enter here into political abstractions or theories which involve the political future of the Southern Continent. In a half century from now, looking backward, it may be interesting to see how speculative principles have yielded to hard economic facts. The point for the present is that South America has a future which is just becoming known to itself. In all its possibilities, industrial and political, this may be described as a geographic future, and the geography is commercial rather than political geography.

The influence of the physical aspects of the continent always must be considered in relation to South America as a whole. The 16th-century idea that the precious metals constituted the principal wealth of a nation has been very slowly dissipated. The mineral resources of the Andes and of the other mountain systems of South America will continue a very potent incentive during the next half century, but the greater development is going to come from supplying what mankind eats and wears. South America's

productive resources must be considered in relation to the world's cotton crop, wool clip, cereal products, coffee crop, sheep and cattle, and rubber. Thus the Amazon forests, the Brazil coffee plantations, the Argentine wheatfields and grazing ranges, and the Chilean nitrate beds are all to be considered, as well as the mines of Bolivia and Peru.

Some epoch-making economic events will mark the coming half century. There will be an overflow of capital from the United States, and this will be an enormous factor in securing the development of the various countries. Up to this time our capital has been so fully employed at home that it could not be induced to venture abroad. Now a new condition, fully recognized in the circles of high finance, though not appreciated by the people at large, is arising, and this new condition is marked by the investment of large sums of money in railway and similar construction enterprises as well as in mines. These investments are tentative and preliminary, but they recognize the growing necessity of finding an outlet for redundant funds in the South American field.

There is also, of course, the Panama Canal, which has incalculable possibilities for the west-coast countries without in any way impairing the growth of the Atlantic regions.

North Americans are more familiar with the Atlantic coast, and for various reasons those countries already have shown the most marked progress; but the general line of development during the next fifty years may be described as inter-South American and not restricted to any one region.

THE BUILDING OF RAILWAYS

It was just about half a century ago that the South American countries began to build their first railways. The Argentine Republic in 1907 will hold a railway exposition at Buenos Aires to commemorate its first railroad, which was a short and unimportant one. Brazil started its lines somewhat later, while on the Pacific coast there were various schemes for piercing the Andes. One of the first railroads constructed in South America was in southern Peru, from Arica to Tacna, and the prediction was that it soon would cross the volcanic coast Cordilleras and reach the great central plain of Bolivia. Another line was from Valparaiso and Santiago right to the mountain wall of the Cordillera, and this was expected to bore its way through and reach the pampas of Argentina. But half a century passed and the Andes wall was still unconquered and the skeptics renewed their doubts whether it ever would be pierced.

On the Atlantic slope the engineering difficulties were not so great and both Brazil and Argentina from year to year spread out their systems of railways; yet, considering the resources of the regions to be developed, these extensions were not up to expectation, and the prophets of doubt again raised their distressed voices. Prophets of this class, however, lacked the sense of proportion and failed to note the really remarkable development that had taken place. Few of them yet have an idea of the enormous foreign commerce that has been developed by the Atlantic coast countries, which now reaches approximately $800,000,000 annually and soon will be $1,000,000,000.

THE DEVELOPMENT OF BRAZIL

It may be that fifty years hence northern Brazil—that is, the torrid region of the Amazon—will not have a notably greater population or a greater commerce than now exists, for much of that vast basin is not a white man's country and is not susceptible of permanent settlement by the Caucasian races. It is fifty years since Alfred Russell Wallace wrote his fascinating description of life on the Amazon, and in another fifty years the civilization may not be markedly different. It is even possible that in another half century the increasing appetite for crude rubber will have caused the gum forests to be depleted almost completely; yet the measures adopted by the Brazilian

government for preserving this industry and for encouraging new cultivation are taken especially with a view to fifty years and a century hence. So it is more probable that Para, at the mouth of the Amazon; Manaos, the fluvial capital; and Iquitos, the Peruvian rubber metropolis, to which Commander Todd, of the United States Navy, took the *Wilmington* a few years ago, will show a growth proportionate to that of the last half century. In the case of Iquitos the half century cannot be taken as the measure mark of growth, since its existence only dates back a quarter of a century.

With Brazil the greatest development is more likely to be in the semi-tropical and the temperate regions in the southern part of its extensive territory. No reason exists for imagining that in half a century the country's position as the chief source of coffee production will be altered, and there is cause to believe that vast cotton plantations also will exist; but the more rapid growth will be in the states of southern Brazil where the cereals are raised. Brazil is so vast and, except on the fringe of coast, is so undeveloped that it is difficult to guess at this period how far the development will advance inland. It may not progress very far in fifty years, and yet, with the very large area which is contiguous to the coast, even a relatively slight growth would add very materially to the productive resources and the commercial opportunities of the country.

There is almost a certainty that a phase of development which follows the line of least resistance will be realized within the next fifty years by the construction of a railway trunk from Pernambuco to the border of Uruguay. This is the grand conception known as the Interoceanic Railway, whose ultimate purpose is to place Pernambuco in through railway communication with Valparaiso on the Pacific, traversing a total distance of approximately 4,000 miles. The sections through other countries may be overlooked temporarily and this proposed trunk line be considered with reference to Brazil alone. It would run from Pernambuco along the course of the San Francisco River, forming a northeast and southwest artery, giving several Brazilian states needed railway communication by branches and by crossing the systems of the states of Bahia, Minas Geraes, San Paolo, Parana, and Rio Grande do Sul. The distance from Pernambuco to the border of Uruguay is 2,800 miles and the technical conditions for railway construction are not difficult. The Brazilian government gave the project its indorsement fifteen years ago, and some preliminary studies and surveys of the route have been made. It may lie dormant for a quarter of a century or more, or it may be taken up within the next ten years, but it is certain to come within the next half century and to add enormously to Brazil's development, both in population and in production and commerce.

THE GRANARY OF SOUTH AMERICA

The Argentine Republic is best known of all the South American countries because it produces cereals and beef, mutton, wool, and hides in competition with the United States, Canada, and European countries; yet it is difficult to keep pace with the enormous growth of Argentine agriculture during the last few years, just as very many persons are still unable to grasp the fact that instead of being a little country somewhere down in South America it is 28 times the size of Ohio, and that while in the northern regions it produces sugar and other tropical products, yet as a whole it is to be viewed as another Mississippi Valley. The Argentine Minister of Agriculture estimates the wheat crop for the current year at 3,882,000 tons, the area under cultivation being 14,028,000 acres. The foreign commerce this year will exceed $550,000,000.

The population of the country is not in excess of 5,250,000. Argentina easily has room for 50,000,000 inhabitants. I don't pretend to say that it will have 50,000,000 or anything like that number fifty years hence; yet there must be an

appreciable growth, for the country can sustain a dense agricultural population from its northern border clear down through Patagonia, and settlements will spread through all those regions. Buenos Aires in 1856 had 100,000 inhabitants; today it has more than 1,000,000. It is no wild flight of fancy to prophesy that in another fifty years its population will be 2,500,000, and that on the Southern Continent, 2,000 miles south of the Equator, there will be a city which may not be exceeded by more than two cities in the United States.

In considering the industrial and commercial South America of fifty years hence as relates to the Atlantic coast, it would be better to disregard the lines formed by the boundaries of countries and to consider Argentina, Uruguay, southern Brazil, and part of Paraguay as one section, for in this region are the enormous productive resources which constitute it the world's granary, that will be drawn upon as rapidly as the United States and Canada require their own agricultural products for home consumption. The statistics of agricultural output for this central region will be the measure of growth. Another means of measuring it will be the shipping statistics of Buenos Aires and Montevideo.

THE WEST COAST COUNTRIES

I have had opportunity to consider recently in a separate volume* the economic effect of the Panama Canal on the west-coast countries of South America, and also have had frequent occasion to outline the possibilities of the Pan-American Railway project. For that reason I shall give these subjects only brief consideration here, starting with the premise that the railways will spread across the Andes and make some of the regions on the eastern side tributary to the west coast. In stating that the efforts to pierce the Andes from Tacna and Valparaiso did not come up to the expectations of a half a century ago, I neglected to add that the beginning of the present fifty-year period will be marked by this through communication. The trans-Andine tunnel through the Uspallata Pass from the Chilean side to the Argentine side at Mendoza will be completed within less than three years, and the railway from Arica and Tacna to La Paz, in Bolivia, will be finished within four or five years. These results are to be accomplished under contracts already let.

In the Intercontinental or Pan-American Trunk Line project undoubtedly there will be long halts before all the gaps in such sections as those between Cuzco, in Peru, and Quito, in Ecuador, are completed; but all this is easily within the vista of half a century. The spell of the Inca civilization may come over the railway builder in Peru, but from the ruins of that civilization he may take lessons in road construction which can be applied to railway lines.

It is an engaging theme to inquire whether, in addition to the coast development, within half a century the heart of South America will really have the arteries of commerce pulsating through it. Now Bolivia, in the Andes, may be considered as the heart of South America. Here, too, there have been projects almost half a century old for opening up this great interior to the outside world. Thirty years ago Colonel George Earl Church, one of the most distinguished of American civil engineers, entered heartily into the project of railway building in connection with river navigation, which was to insure the through route to the Atlantic by way of the Amazon and its affluents. The plan went down in disaster due to financial and other reasons. But today Bolivia has the assurance, probably within ten years, of railway outlets to the Pacific at Arica, at Mollendo, and probably at Callao, while on the Atlantic side there is the certainty of reaching the Plata at Buenos Aires through the connection with the Argentina systems, and a later possibility of reaching the Atlantic through Paraguay.

For the Amazon there is also now the

*Panama to Patagonia.

XUM

certainty of realizing Colonel Church's plan, for the Brazilian government will be impelled by the outlets Bolivia is securing in other directions to build the long-deferred railway around the falls of the Madeira to Santo Antonio. It already has made financial provision for this purpose just as Bolivia has made provision by contracts signed within the last few months for the connection of a series of links from Laka Titicaca to the border of Argentina, and also to Puerto Pando, on the Beni River, which is the beginning of navigation to the Amazon. At the very farthest, the opening up of this heart of South America may be placed at a quarter of a century instead of fifty years hence.

THE NETWORK OF RIVERS

There is another phase of river transportation which undoubtedly will be considered within the next fifty years. General Rafael Reyes, the President of Colombia, in his explorations showed the possibility of interfluvial communication through all South America. Other explorers and writers have advanced various propositions for bringing the Mississippi Valley, through the mouth of the Mississippi, and the immense interior of South America, through the mouths of the Amazon and the Orinoco, into more direct communication. It is very fascinating to think of sailing from New York or New Orleans up the Orinoco or the Amazon, and thence in smaller boats, and even canoes, with an occasional portage, dropping down to Buenos Aires. Fifty years hence it is quite probable that the canal, of less than 1,000 feet in length, which the early Portuguese explorers proposed from the headwaters of the Guapore, the largest affluent of the Madeira, in the Brazilian state of Matto Grosso, to connect with the streamlets Aguapey and Estiva, which empty into the Jauru, a tributary of the Paraguay, will be completed and a through means of navigation be obtained. The Portuguese made this canoe voyage without much portage. Some years ago, in Rio Janeiro, I saw the plans for the modern canal connection, and they appeared not only feasible in the engineering sense, but practicable in the commercial view. Yet this general fact is apparent—water transportation by means of inland rivers never reaches its full utility until the railway systems begin to spread a network among the river courses; nor do colonization and immigration follow upstream. There are numerous regions in South America easily accessible by river navigation, yet the efforts to plant colonies at their headwaters have failed. When the railway begins to creep along, then the people appear.

IMMIGRATION VERY NECESSARY

The whole question of immigration has to be considered in discounting the South America of fifty years hence. The movement has been very slow, and even with the better government which is now assured in most of the South American countries, it is not likely to keep pace with the needs of production; yet in time it will be secured, and probably there will be a notable movement within the next few years to Argentina, Uruguay, and southern Brazil, and later to the inter-Andine regions.

It must follow, if the development which is to show that the South America of fifty years hence has made much greater progress than during the preceding half century does not prove an illusion, that the minor streams of immigration will turn into currents. The native Indian stock of the South American countries must be overlapped. The South America of the middle of the 20th century will be less Spanish also, though possibly not less Latin, for one of the great sources of immigration which is peopling Argentina and some sections of Brazil is from Italy. The Panama Canal is likely to bring this element around to the west-coast countries. The northern races—Scandinavians, Germans, and natives of the British Islands—will find much larger areas of settlement than heretofore they have cared to seek. The

Scotch sheep herders already have taken very kindly to Patagonia, while Welsh and Russian colonies also are established in that region. It may even be that from the United States there will be some overflow of our own cosmopolitan population, though the direct ocean routes cannot be changed and Argentina and Brazil must continue closer to Europe than to the United States.

In conclusion, viewing South America fifty years hence, both in relation to the productive regions which will attract immigration and to the conditions of life which insure a permanent population, it may be said that the star of empire takes its way south from the Caribbean to Patagonia. That is the course for the grain-raiser, for the wool-grower, and for the grazer. It is also the course for the miner who follows the trend of the Andes.

A NEW PERUVIAN ROUTE TO THE PLAIN OF THE AMAZON

By Solon I. Bailey

Associate Professor of Astronomy, Harvard College Observatory

The author of this article was sent to the west coast of South America in 1889 to determine the best site for the Southern station of the Harvard College Observatory. He examined the west coast from the Equator to the southern coast of South America, and upon his report Arequipa, Peru, was selected. Professor Bailey had charge of the work there for eight years, and also established a meteorological station on the summit of El Misti, at an elevation of 19,000 feet, where observations have since been carried on. It is by far the highest scientific station in the world.

A COMMERCIAL conquest of the heart of the South American continent is going rapidly forward. While the coast regions have been settled and civilized for centuries, colonization has hardly touched the great plains of the upper Amazon and the lower valleys of the eastern Andes. Only yesterday, indeed, this vast region was almost unknown; today little remains which has not been at least partially explored. Nor is it now any thought of the millions who in the future may here make their homes which is working for the development of the country, but simply the desire to be first in the exploitation of its natural wealth, especially rubber.

Commerce naturally follows the lines of great rivers, and nowhere else are there such vast water systems as in South America; nor does it seem improbable that the same law will hold true here, especially after the possibilities of the tributaries of the Amazon have been properly developed, and that the commerce of southeastern Peru and Bolivia will find its way to the Atlantic, thousands of miles distant, rather than to the Pacific, only a few hundred miles away. This has been true in the past, and is strikingly illustrated by Iquitos, in northeastern Peru, which is practically an Atlantic seaport, although in Peruvian territory and 2,000 miles from the mouth of the Amazon. From southeastern Peru and Bolivia, however, in the regions of the Madre de Dios and the Beni, communication with the Atlantic is more difficult. This is due especially to the falls of the Madeira, near the junction of the two rivers named above. These rapids block navigation at a distance of 2,000

Arequipa, the Chief City of Southern Peru

miles from the mouth of the Madeira. Above the falls steamships may again be used; but the danger and loss in passing the rapids are so great that, until this difficulty is overcome, another route is very desirable. The Pacific is comparatively near, but a journey must be made through dense forests and wild gorges to the crest of the eastern Andes and down to the Titicaca Plateau, where railway transportation to the Pacific is ready. Until recently no direct route had been opened up.

Peruvian Station of Harvard College Observatory, near Arequipa

Altitude, 8,000 feet. In the background rises the nearly extinct volcano, El Misti, 19,000 feet high. On its summit a meteorological station was maintained for eight years.

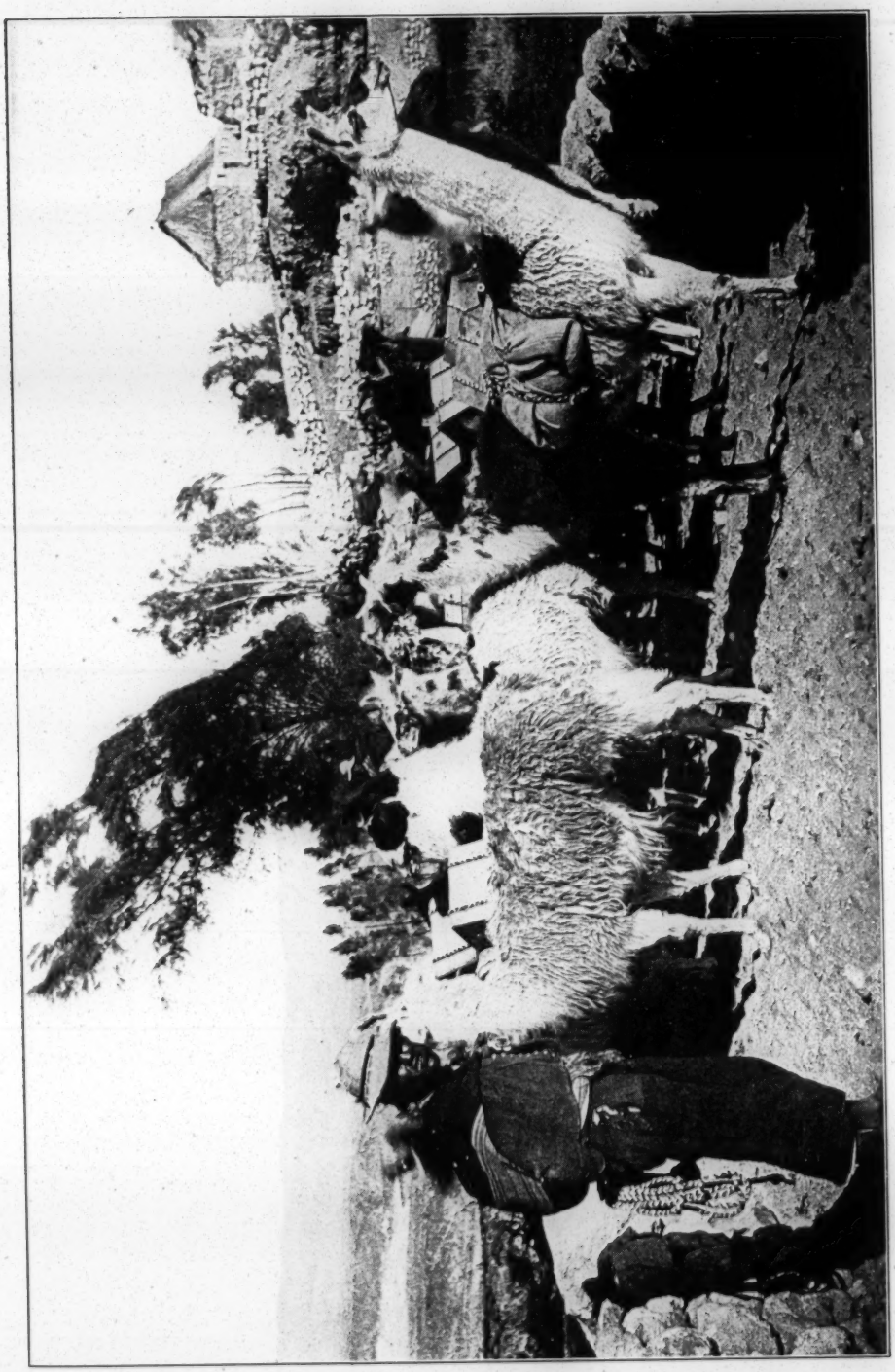
At the present time there are several ways of reaching the Madre de Dios and its tributaries, but the most direct and comfortable route is that which I traversed in 1903 before its completion. Since that time many improvements in the road have been made.

From New York one may reach the Peruvian port of Mollendo in about three weeks. At the present time it is necessary to cross the Isthmus of Panama by rail, but when the canal is completed through steamships from Atlantic cities will doubtless call at all important South American Pacific ports. From Mollendo a railway journey of seven or eight hours takes one across the desert to Arequipa, the chief city of southern Peru. Arequipa lies on the western slope of the Andes, at an elevation of 7,500 feet. This elevation within the tropics furnishes an almost ideal climate. The whole region west of the Andes in Peru is, however, desert and capable of cultivation only by irrigation. Arequipa owes its existence to the small River Chile, whose waters are exhausted in irrigating the valley which surrounds the city.

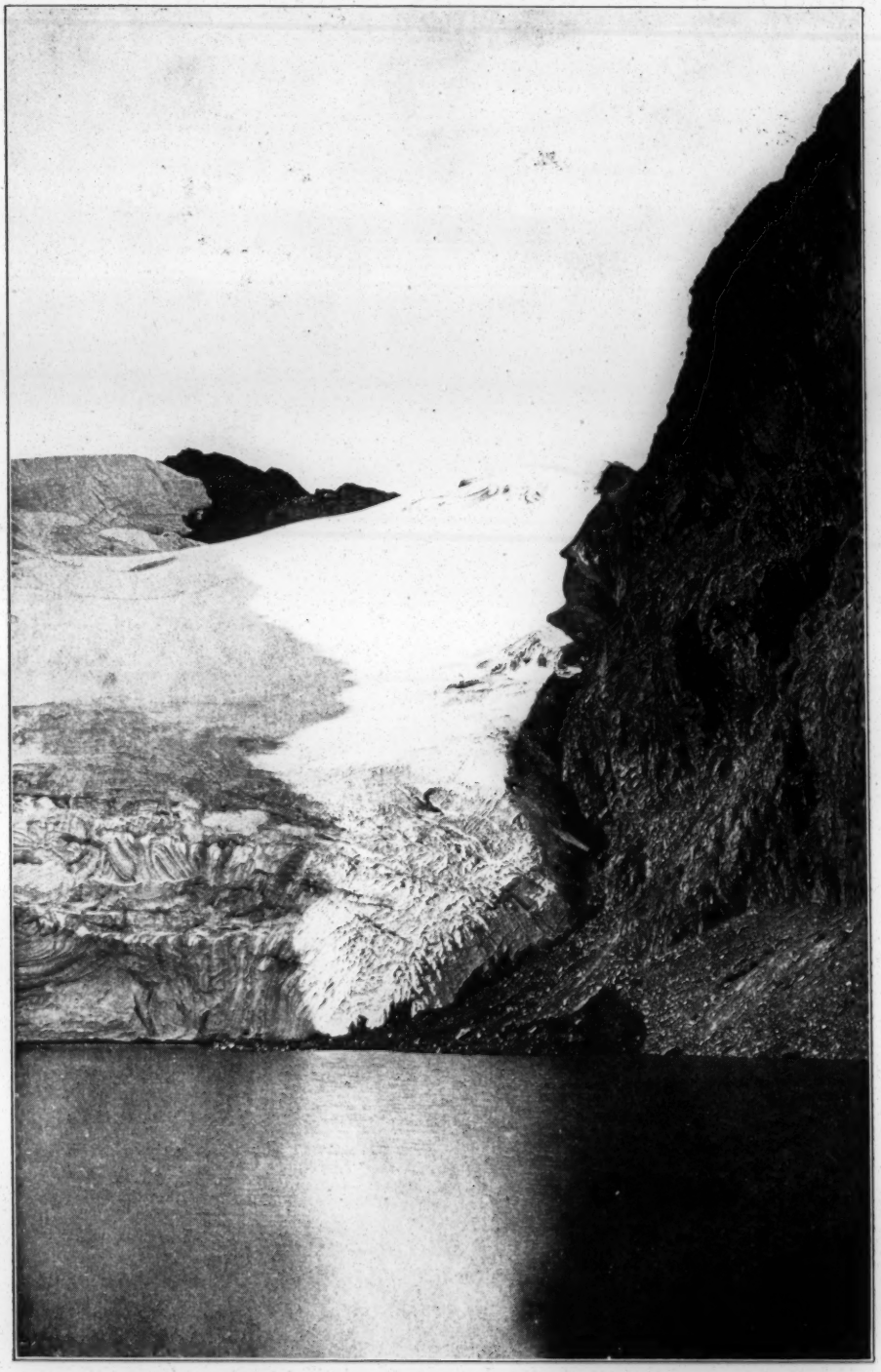
A railway leads from Arequipa to the Titicaca Plateau, which lies between the eastern and western Andes. On the lofty and desolate Puna it reaches an altitude of 14,660 feet before it descends to the plateau. Lake Titicaca has an elevation of about 12,500 feet. This great region between the different ranges of the Andes was the home of the various Indian races that under the domination of the Incas made up the semi-civilized population at the time of the Spanish conquest. Their descendants, for the most part full-blooded Indians, still dwell on the same plateaus and lofty valleys, but in a low social condition. They have lost rather than gained by the coming of a higher civilization.

CROSSING THE ANDES

At Tiripata, on this plateau, it is necessary to leave the railway and cross the eastern Cordillera. Through American enterprise, in connection with an enlightened policy on the part of the Peruvian government, a wagon road has been constructed for a portion of the route across the plateau, and will

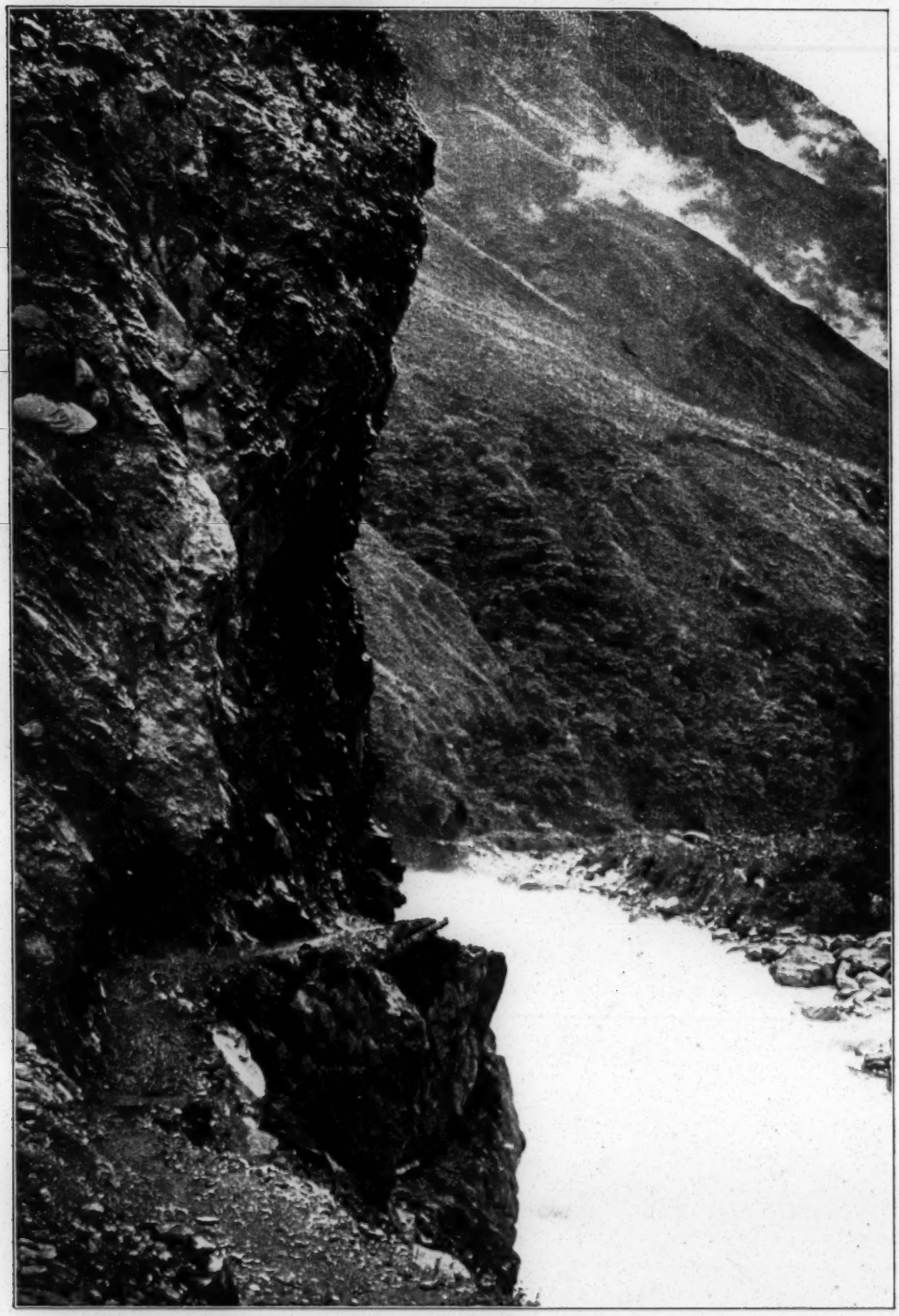


Group of Llamas and Their Indian Drivers from the Titicaca Plateau



Lake and Glacier in the Aricoma Pass of the Eastern Andes

Altitude of the pass, 16,500 feet



Mule Trail of the Inca Mining Company, Eastern Slope of the Andes

In many places this trail passes along the side of a perpendicular cliff, several hundred feet above the river

Among the Eastern Foothills of the Andes, a Region of Almost Perpetual Cloud and Rain

be carried over the mountains to a small Indian town on the eastern slope. From this town a good trail for miles will be built, down to some navigable river on which small steamers can be used. With the railway most of the comforts of civilization are left behind. In four or five days of mule-back travel we mount the eastern Andes, winding our way through the Aricoma Pass at an altitude of about 16,500 feet. Here the scenery, if the weather is fine, repays the hardships of the trip. Snowy mountains and enormous glaciers are mirrored in the waters of lakes, which change their colors with every whim of cloud and sky. More often, however, the traveler is wrapt in blinding snowstorms, which shut out every glimpse beyond the narrow limits of a few feet. Hour after hour he clings half frozen to his mule, his discomfort heightened by the mountain sickness, which is one of the terrors of these lofty regions. To lose his way under these conditions may mean death.

On reaching the eastern crest of these mountains, if the view is clear, one seems to be standing on the edge of the world. The eye, indeed, can reach but little of the vast panorama, but just at one's feet the earth drops away into apparently endless and almost bottomless valleys. We may call them valleys, but this does not express the idea; they are gorges, deep ravines in whose gloomy depths rage the torrents which fall from the snowy summits of the Andes down toward the plain. We might hunt the world over for a better example of the power of running water. The whole country is on edge. Here all the moisture from the wet air, borne by the trade winds across Brazil from the distant Atlantic, is wrung by the mountain barrier and falls in almost continual rain.

Near the summit of the pass only the lowest and scantiest forms of vegetable life are seen. In a single day, however, even by the slow march of weary mules, in many places literally stepping "downstairs" from stone to stone, we drop 7,000 feet. Here the forest begins, first in stunted growths, and then, a little lower down, in all the wild luxuriance of the tropics, where moisture never fails. The lower eastern foot-hills of the Andes are more heavily watered and more densely overgrown than the great plain farther down. Here is a land drenched in rain and reeking with mists, where the bright sun is a surprise and a joy in spite of his heat. In these dense forests, with their twisting vines and hanging lianas, a man without a path can force his way with difficulty a mile a day.

In these foot-hills, at an elevation of 4,000 or 5,000 feet, is the Santo Domingo mine. Here is an American colony provided with comfortable, almost luxurious, dwellings, which are flanked by the unsightly huts of native miners and Indians.

From this abode of comparative luxury we again started mule-back along a new but splendid trail down into the "rubber country." Four days of this travel, through forests peopled with nothing more frightful than jaguars and monkeys, brought us to the end of the trail. Day after day ten hours a day in the saddle is sufficiently tiresome, but it was with regret that we left our animals to try the forest afoot. Our first experience involved only a walk of a couple of hours, but over a trail so narrow, steep, and blocked with trees and roots that we were soon exhausted. We were glad enough to arrive at a clearing on the bank of a recently discovered stream called the New River. After a delay of a day or two at this post, we made our way down stream a few miles to the junction of the New River with the Tavora, on whose waters we intended to embark. Six hours of walking over a path known in the picturesque language of my companions as "A hell of a trail" brought us to the junction, where we found another camp with a group of workmen of various nationalities.

THROUGH AN UNKNOWN COUNTRY

The party which I joined for the trip down the rivers was under the direction of Mr Chester Brown, the general manager of the Inca Rubber Company. To him and to his genial brother "Fred" I am indebted for some of the most interesting experiences which the present day furnishes. The route we took to the Madre de Dios had been traversed but once previously by a white man, and then only a few weeks before by an engineer in the employ of the company. At the place where we embarked on the River Tavora we were still well up among the foot-hills of the Andes, and navigation, even in canoes and rafts, was attended by many difficulties and some dangers, owing to the numerous rapids.

The canoes are dugouts shaped from a single log. They are from twenty to twenty-five feet long, two or three feet broad, and readily carry half a dozen men and several hundred pounds of freight. For the passage up-stream only canoes are used, and they are propelled by paddles or by poles, according to the depth and swiftness of the water. For the journey down the river, however, rafts are also used, since the rapid current renders great exertion unnecessary. Many of the native woods are too heavy for rafts; indeed, a number of varieties sink at once, so great is their specific gravity. The variety used for rafts is nearly as light as cork. A number of logs of this raft-wood are fastened together by driving through them long wood pins, made of a kind of palm which is so hard that it takes the place of iron. Cross-pieces are then fastened on in the same way, and the front end is made pointed, so that the craft shall not be stopped by collision with driftwood or boulders. When finished the raft consists entirely of wood, and no tool has been used in its construction except an axe.

With two rafts and two canoes, our party set out one day about noon. The trip began with the running of a swift rapid, which was one of many to follow. The canoes generally led the way and pointed out the best route. In many cases there were sharp curves, with here and there the stranded trunks of great trees and huge boulders. Many of our experiences were sufficiently exciting, and a fall into the river was a common incident of the trip. Our company included a crew of ten men, a motley crowd of various colors and nationalities. A nearly continuous stream of profanity attended the various maneuvers of our fleet, which reached its climax in intensity and picturesqueness when some sudden jar projected one or more of the boatmen into the water. At such times familiarity with the language of the boatmen would have been a misfortune. In the swifter and shallower rapids of the upper streams it was often necessary to lighten the load by wading in the water beside the canoes, which were guided by hand or even by a rope carried along the bank. This sort of travel, together with frequent rains, caused all the party to be soaked with water from morning to night, and we were fortunate when the kits were kept dry, so that the night could be passed in comfort. At one time during the expedition rain fell in prodigious quantities, causing the river to rise nearly ten feet within twenty-four hours. Progress became difficult and extremely dangerous, owing to the swiftness of the current and the trunks of trees carried along on its surface. We were obliged to make camp and wait. This we did at a place which seemed sufficiently elevated above the surface of the river. The following night, however, the water reached our camping ground and compelled us to change quarters in the darkness. Pitching a new camp at midnight, in a tropical jungle, in a pouring rain, is a far from cheerful occupation.

The Tavora, a river found on no map yet published, is one of the branches of the Tambopata, a stately stream but

A Rubber Tree

A Camp in the "Rubber Country"

Curing Rubber by Smoking It. A Native Hut, Eastern Peru

Natives Living on the Tambopata River, a Tributary of the Amazon

little known. The Tambopata is a tributary of the Madre de Dios, which joins its waters with those of the Beni and other rivers to form the Madeira. The Madeira is one of the great rivers of the world, and yet it is only one of the sources of the mighty Amazon.

Until our embarkation we had been continually in deep, densely wooded valleys, our view always shut in by their lofty sides. On the second day down the Tavora, however, as we swept out into the broader waters of the Tambopata, the hills fell away suddenly, leaving before us only the level Amazonian plain—one vast forest, extending unbroken, save for the river courses, for hundreds, even thousands, of miles. At rare intervals the banks rise in bluffs fifty or a hundred feet above the general level, but usually it is an unbroken, forest-covered plain, rising only a few feet above the level of the river, and in time of flood covered for great distances by the swollen waters. It is a forest, so far as I saw, without a single natural opening or glade, except along the banks of the rivers. For days we had longed to see the hills melt away and the plain appear; a month later, while working our slow way up the river, we watched with even greater eagerness to catch again a glimpse of the blue hills outlined against the sky.

THE CHUNCHOS

In the shade of this ever-present

The Peruvian Military Camp near the River Madre de Dios

forest live various groups of savages, known as *Chunchos*. They dwell in general along the banks of the rivers, and indeed they seem almost as much at home on, or even in, the river as on the land. The reputation which they enjoy is none of the best. We met half a dozen groups during our expedition, some of whom apparently had never before seen white men. They impressed me as simple and well-disposed, if treated fairly, and surprisingly intelligent. Indeed, several times while attempting to converse with them by means of signs I could not resist the impression that they were merely masquerading under the guise of savagery. From almost every standpoint, however, they are mere savages. They are nomadic, roaming up and down the rivers and building only the rudest huts. They have no metal implements, so far as I could learn, and few, if any, made of stone. Some of them appear to have no proper household utensils, and such scant pottery as I saw was very rude. Their clothing is made of the fibrous bark of a certain tree, called by them *Ianchama*. This is stripped off in large pieces and pounded on flat stones with great patience until the coarser materials are removed and only the inner, tough, but rather soft and pliable, bark is left. This resembles in texture a coarse cloth. Two pieces of this material are sewed together to form a sleeveless shirt which reaches from the shoulders to the knees. Shawls and loin-cloths are also made from the same bark. These garments are not always worn, however, for when we approached a village unannounced both men and women completely nude were sometimes seen.

Their ideas in regard to propriety were satisfied by a loin-cloth, and several young women of modest mien and rather dignified presence stood and at-

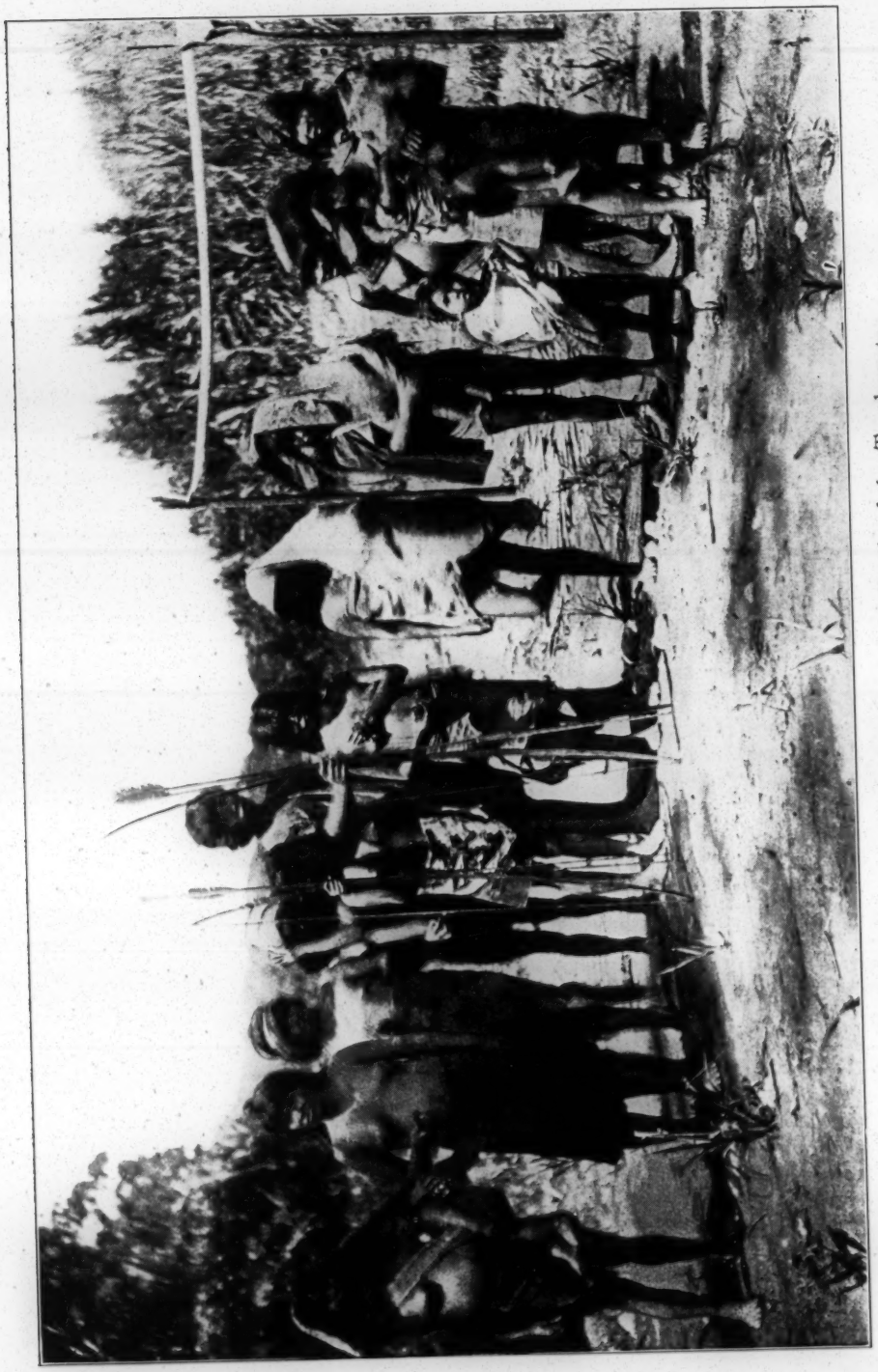
tempted to talk with us dressed in this fashion. Another girl, without the slightest suspicion in her manner of any impropriety in the act, removed the shirt she was wearing in order to exchange it for one made of cloth offered to her by a member of our party. The Garden of Eden still lingers here. These Amazonian Eves have evidently never heard of The Fall. Like other people, however, they take pride in dress. Jewelry also is worn, made of the teeth of monkeys or of pretty shells. Nose ornaments are worn, which no doubt add some charm for Chuncho eyes, but which are decidedly inconvenient when eating.

Insects are a great pest, even to these hardy children of the forest, who slip into the water frequently to be free from their stings and to cool themselves. Men and women, boys and girls, threw themselves into the water, unmindful of our presence, and swam about in unencumbered grace.

Food is abundant with them—plantains and yuccas, as well as game and fish. The weapons of war and those of the chase are much alike, consisting of bows, spears, and arrows, all made of an extremely hard variety of palm. With these they wage war on unfriendly neighboring tribes, and also hunt the tapir, deer, monkeys, wild turkeys, and fish. They roast the flesh of animals and fish, either by placing it directly in the fire or first inclosing it in hollow pieces of cane or bamboo. The heads of monkeys and of the larger kinds of fish seem to be regarded as dainties, and are simply placed in the fire and roasted or burned to the proper point. Monkey meat, when properly cooked, is palatable enough; but the appearance and manner of a large monkey is so human that when roasted and served whole it gives a cannibal air to the meat somewhat disagreeable to me. No such thought, however, comes to the Chuncho.

They have a curious combination of rather bright and "taking" ways and of low and filthy habits. Their continual bathing renders them free from personal unpleasantness, though it is doubtful if they enter the water with any idea of cleanliness. Their sense of humor is as quick as that of an Irishman. With no idea of our language, they seemed to catch a joke at once and were frequently laughing. This is in great contrast with the Indians of the Peruvian Plateau, who are slow in thought and movement and seldom laugh, at least in the presence of strangers. Many of the Chunchos whom we met apparently saw white men for the first time. Certainly no one of them had ever seen a bald man. One of our party was decidedly bald, and when he removed his hat a look of surprise and amusement passed over the faces of the whole group, accompanied by sly, if expressive, remarks. Freedom from the use of hats may account for the absence of baldness among them. It is an interesting fact, however, that among the different groups which we met, no person, man or woman, appeared to me over forty years of age. What became of the aged I could not learn.

I have never seen a more interesting affair than a luncheon which a party of Chunchos took with us on our way down the Tambopata. Our limited stores of provisions contained marvelous novelties for them. Sugar was quite unknown to them. Each took some in the palm of his hand and tasted it slowly and cautiously; then a smile of satisfaction lighted up his face, and the sugar disappeared. Men and women, impelled by curiosity, mingled freely and frankly among us, and although among themselves the women are probably accustomed to eat after the men, with us they all came together in apparent equality. For pickles they expressed great disgust. Tea was taken with indifference or contempt, but cocoa with plenty of sugar pleased them extremely. A little confectionery, in the form of rather solid balls, was eaten



A Group of Chuncho Savages on the Bank of the Tambopata

with emphatic nods of appreciation, with the exception of two or three pieces which one of them saved. He explained, by digging a hole in the ground and pretending to cover up one piece, that these were to be kept for seed, so that in the future they might have plenty of so delicious a fruit.

Of their religious life or the lack of it almost nothing could be learned from the bands we met along the Tambopata. At Maldonado, however, the newly established military post of Peru on the Madre de Dios, were two or three Chunchos from another river, who had become residents of the camp and had learned some Spanish. The commandant of the post and I spent some time trying to find out whether these savages have any idea of religion. The commandant, a good Catholic, attempted to explain to them some idea of God. They listened apparently in vague wonder, and when asked if their people had no such belief replied in the negative. The idea of a future life after death, so far as we could learn, was not familiar to them. At the present time there are several thousands of these savages living in scattered groups of twenty or more along the rivers flowing into the Madre de Dios. Many of them are just coming into intimate contact with the white race. A condition little better than slavery awaits them.

IS IT A WHITE MAN'S COUNTRY

For the present the chief interest in this great, undeveloped region lies in the fact that it is rich in rubber and a few other natural products. But what of its future? Is it "a white man's country?" Parts of it undoubtedly offer favorable conditions for white laborers, so far as climate is concerned. From the crest of the eastern Andes down to the level plains, every climate, from the frigid to the torrid, is passed in succession. This zone, however, is narrow and badly cut up into deep valleys with precipitous sides. Agriculture has its difficulties. It is stated that a farmer arrived one day at the Santo Domingo mine in very bad condition. Asked what had happened to him, he replied that the night before his farm had fallen on him. Landslides in this region are certainly frequent. Probably enough water power is going to waste on these slopes to do the work of the world. Within a short distance large streams fall in a continuous mass of foam 10,000 feet or more. Nor does it seem to me probable that the lower plains will be found especially unsuited to the white race. At present in these endless forests insects swarm in countless millions and malaria doubtless is prevalent; but, with the forests cleared away and with the comforts of civilization, the conditions would be much improved. The altitude is some 2,000 feet above sea-level and the heat by no means extreme. During our journey on the rivers the highest temperature recorded was 96° F., and a temperature above 90° was extremely rare. One hesitates even in imagination to picture what manifold industries may be found among these foot-hills in coming centuries, and what millions of prosperous dwellers may be clustered on the plains at their feet.

FROM PANAMA TO PATAGONIA

The following article is abstracted from "Panama to Patagonia," by Mr Charles M. Pepper, recently published by Messrs A. C. McClurg & Co., of Chicago. It is a very timely volume, filled with useful and interesting information about the west coast of South America. The quotations are copyrighted by A. C. McClurg & Co.

THOUGH it is desirable to know Spanish, which is the idiom of South America with the exception of Brazil, the chance traveler who wants to go down the coast, or even take an occasional trip into the interior, can get along with his stock of English. In all the seaport towns are English-speaking persons, merchants or others. On the ships English is as common as Spanish, and in some of the obscurest places the tongue of Chaucer may be heard. In one of the most out-of-the-way and utterly forsaken little holes on the coast I found the local official, who was sovereign there, teaching his boy arithmetic in English. He had been both in England and in the United States, and while his own prospects now were bounded by the horizon of the cove and the drear brown mountain cliffs that shut it in, he was determined that his son should have a wider future. There are also many young South Americans who have been educated in the United States and some of whom are met at almost inaccessible points in the interior.

CONSERVATIVE PERU

In Lima, Peru, the Italians are by far the most numerous among the Europeans. They have largely the retail trade and they are property-holders in an unusual degree. A Little Italy lies across the Rimac River.

A very large Chinese population exists in Lima. Much of it is the second and third generation. Originally the Chinese were brought to Peru as contract coolie laborers, but of late years the immigration has been of a normal kind. The Chinese of this period have discarded the queue and have adopted the conventional dress. Some wealthy Chinese merchants have an appreciable influence in the commerce of the country. China keeps a consul-general in Peru with semi-diplomatic functions, and usually he has enough to do.

Peru is almost exceptional among the South American republics for establishing and maintaining the gold standard. This is a brilliant and instructive chapter of financial history. The beginning was made in 1897, following the presidential election in the United States. General Pierola was president and was strongly in favor of the gold basis. Though Peru was a silver-producing country, a law was passed providing that gold should be the sole standard, that the customs duties should be thus paid, and that there should be no further silver coinage.

In the ten years following 1895 the banking capital of Peru increased at the rate of 150 per cent, while the deposit accounts ran up from $4,500,000 to $14,000,000. The banks pay dividends of 14 to 16 per cent. Volumes might be written about the causes which are leading to the commercial and industrial prosperity of the country and contributing to the political stability. The convincing evidence of the fact is the growth in the bank deposits.

VALPARAISO

Valparaiso (Vale of Paradise) is the largest place on the Pacific coast, with the exception of San Francisco, and it is equally as fine a metropolis. Its population is 140,000. The city lies at the foot of high hills, which no one climbs, because there are ascensors, or elevators, as in Pittsburg and Quebec. Unhappily it has not a Golden Gate and a sheltered harbor. The finest part of the city is the Avenida, or Avenue

Brazil, at once shaded boulevard, business thoroughfare, and promenade.

The city has many fine business blocks of modern construction and the government buildings are unusually tasteful and harmonious. All bear the impress of Italian architecture.

The port, as is natural, is cosmopolitan. The German colony is largest, and after that the Italian, in numbers, though in influence they are hardly so strong as either the English or the French. The French community is self-contained and is an important factor in commerce. The Britishers, chiefly from Scotland, are in everything except retail trade. Though the English language is common, Valparaiso is the one city in South America in which I heard German spoken oftener. The shipping of Valparaiso is vast and varied, a floating panorama of many nations, like a miniature Hamburg. The English lines maintain a regular fortnightly service of cargo and passenger vessels, and also a special service of cargo vessels to Liverpool. The steamers are of 5,000 tons and upward. The distance to Liverpool by way of the Straits is 9,500 to 9,800 miles, and the sailing schedule is 35 days.

The Bay of Valparaiso is a discouraging one. It is surprising that so extensive a commerce can be handled with such poor facilities. The shipping approximates 1,000,000 tons yearly. The engineering difficulties in the way of creating a real harbor are well understood, though not easily overcome. The rains wash the hills down into the sea, but the detritus, or silt, does not fill in what seems to be the bottomless bed of the ocean, so profound is it. There is no breakwater. At the beginning of every winter season the question is raised, What will be the harvest of the disaster? It seems incredible that vessels of 3,000 tons could be lost in this bay, but that is what has happened. In May, 1903, voyaging down the coast in the *Tucapel*, we were told that the *Arequipa*, of 3,000 tons burden, was the next ship following us. One night a savage tempest arose, many of the smaller vessels were wrecked, and the *Arequipa*, foundered and went down with the loss of a hundred lives.

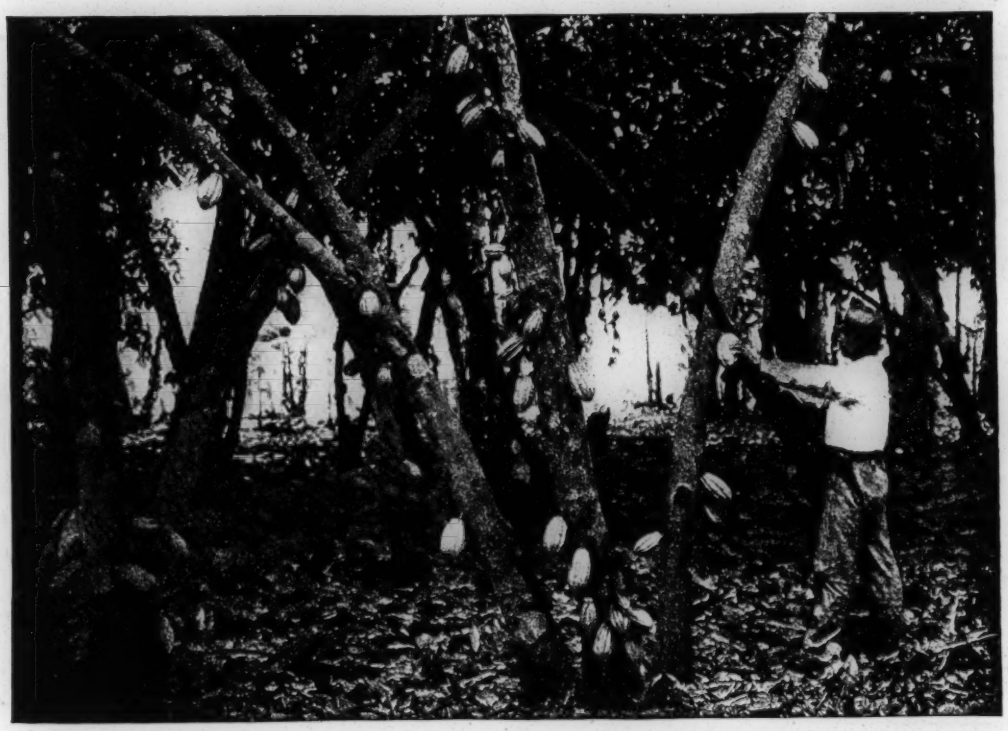
In July, 1904, another destructive storm swept along the coast. The lower part of the city was completely covered with mud and water, the seawall was destroyed, and the railroad badly damaged. The loss of life was not great, but the destruction of property was serious.

In the period from 1823 to 1893 the shipping statistics show the loss of 378 water craft in the Bay of Valparaiso, of which 100 were rowing and sailing boats. The money value was incalculable.

The Chilean government has at last, however, after many discouragements, accepted the plans of Mr Jacob Kraus, the Holland engineer, for conquering the difficulties which Nature has placed in the way of making Valparaiso Bay hospitable instead of hostile to the ships that bear the commerce of many seas. The estimated cost of the harbor improvement is $15,000,000 gold, though the initial provision was for $11,000,000. The scheme contemplates the construction of a series of sea-walls in the bay. The water is so deep that it is considered impracticable to build a single breakwater across the mouth of the harbor.

THE STARTLING DEATHRATE OF CHILE

The figures on the Chilean death rate are startling. The annual death rate has been placed as high as 70 per 1,000 and frequently it is given as 50 per 1,000. This is correct for the majority of the towns and cities, but does not apply to the country as a whole. The official statistics for a period of ten years, which I examined, did not exceed an average of 35 per 1,000; but even that is nearly double the normal death rate in the temperate countries; and Chile, not being in the Torrid Zone, is not subject to yellow fever and similar tropical epidemics. The figures showed that the birth rate and the



From "Panama to Patagonia," by Charles M. Pepper. Copyright, 1906, by A. C. McClurg & Co.

Cacao or Chocolate Trees, Ecuador

One-third of the world's supply of chocolate comes from Ecuador

death rate were almost balanced, since the birth rate ranged from 35 to 37 per 1,000. In 1895 the total births reported were 110,000 and the deaths 92,000, leaving an excess of 18,000 births over deaths. In 1898 the birth excess was a little larger; but in 1901 the births were 116,000 and the deaths 111,000, giving an excess of only 5,000. In previous years the births were not larger and have even fallen below the deaths. In a subsequent year a more normal condition was shown, the births numbering 115,813 and the deaths 88,607. In the two big cities no normal increase was contributed to the population. In Valparaiso Province, with 243,000 inhabitants, during a twelve-month period there were 9,475 births and 9,674 deaths. One year an epidemic of measles caused frightful ravages. In the year 1900, in the city of Valparaiso, the births were 5,610 and the deaths 7,170, and of the latter 2,245 were infants under one year of age. During this annual period the death rate per 1,000 in Valparaiso was 54.4. In Santiago Province, with a total population of 434,000, the births numbered 16,074 and the deaths 17,798. This excess was due to the city of Santiago, where there were 11,000 births and 12,500 deaths in a total urban population of 262,000. The mean average death rate is a little higher than in Valparaiso, though the latter is subject to the vicissitudes of seaports. In a given year only one city of more than 10,000 inhabitants showed a death rate of less than 50 for each 1,000. This was Antofagasta, in which the proportion was 44 out of every 1,000.

NATIVE BOLIVIAN VANITY

The prized possession of the Bolivian Indian woman and her chief pride also, whether she is pure Indian or chola, is her petticoat. Her dowry is in this garment. Like the Dutch woman of tradition, she carries her wealth about with her. These petticoats are of all colors of the rainbow and divers other hues not found therein. I first noticed them at Nazarene, and remarked the love of color, which must be inborn, for the garments were of yellow, purple, violet, fiery red, crimson, scarlet, subdued orange, glaring saffron, blue, and green. They were very short, reaching barely below the knee, and no difference was observed between childhood, maidenhood, matronly middle life, and wrinkled old age. Glancing from my window in Tupiza, I thought it was a parade of perambulating balloons.

These women have a habit which the bashful traveler does not at first understand. When he sees one of them calmly removing a petticoat he is apt to turn away, but he need not do so. It may be that the advancing heat of the day has caused the wearer to discard the outer skirt, but more likely it is the vanity of her sex, and the desire to make her sisters envious by showing what is beneath, for each new vesture disclosed is more brilliant than the one which overlapped it. I sat in the plaza at Tupiza and watched two Indian women try to make each other envious. The first one removed the outer petticoat, which was of purple. This divestment disclosed another garment of blazing red, and after that came a brilliant yellow. The other woman started with a green petticoat, and gradually got down to a mixture of blue and yellow. By that time I had begun to fear for the consequences, and made a pretense of turning my back by strolling to the hotel.

THE MEXICO OF SOUTH AMERICA

Bolivia, in the character, variety, and extent of her resources, is the Mexico of South America. Her mines yielded the precious metals for hundreds of years. She was the casket of gems held in pawn by the Spanish crown. She poured the riches of prodigal mother Nature into the lap of the mother country.

The present Bolivian silver production, which is 8,000,000 to 9,000,000 ounces annually, forms a very small proportion of the world's total output; but, with the building of railroads and the assured decrease of transportation charges, it is a safe prophecy that within a few years the output will be doubled, if not quadrupled. Here Mexico again furnishes the illustration.

FOREIGN INVESTMENTS IN SOUTH AMERICA

While the statisticians vary widely in their estimates, it is reasonable to conclude, from an examination of the leading ones, that Great Britain has $2,000,000,000 in South American investments, of which $300,000,000 to $350,000,000 may be assigned the west coast; Germany has from $475,000,000 to $500,000,000, with possibly $150,000,000 in the Pacific countries; and France, with about the same amount, has west coast investments reaching $100,000,000, her Chilean holdings amounting to $42,000,000.

"Commercial America in 1905," by Hon. O. P. Austin, is the title of a monograph just published by the Bureau of Statistics of the Department of Commerce and Labor. It gives the commerce, production, transportation, finances, area, and population of each of the countries of North, South, and Central America and the West Indies. The total commerce of America for 1905 amounted to $5,050,027,000, of which $2,806,119,000 was that of the United States, and the remaining $2,243,908,000 contributed by the other countries of North, South, and Central America and the West India Islands. All America exports considerably more than it imports, the figures being $2,865,650,000 and $2,184,377,000. The commerce of the United States consists of $1,626,984,000 exports and $1,179,135,000 imports. The monograph is distributed on application.

THE FERTILE PAMPAS OF ARGENTINE

An excellent Commerical Guide to South America is published by the Philadelphia Commercial Museum. The author is Edward James Cattell, assisted by H. S. Morrison and A. C. Kauffman. It is 10 by 12 inches, consists of 300 pages, and contains large maps of each county. Detailed information is given on almost every conceivable subject. The following paragraphs are abstracted from the book:

THE most easterly point of Brazil reaches a longitude much closer to the line passing through Liverpool than the line passing through New York city; for South America and Africa are separated by a shorter span of water than that separating New Orleans from the northern coast of South America. Buenos Aires, capital of the Argentine Republic, on the same parallel of latitude as Cape Town, is 650 miles nearer to that city than to the city of New York. So great is this easterly range of the Western Continent that more than three-quarters of the western coast of South America lies to the east of New York city.

The area of North America in round figures is 8,300,000 square miles, that of South America being seven per cent less, or 7,700,000 square miles. In mean altitude above sea-level both continents show practically the same record. Further, they are alike in being of triangular shape, with the apex in each case lying toward the South Pole. Although North America has an advantage in area, the point most distant from the coast in North America is practically the same distance from the coast line as in the most interior point in South America. It is also necessary to take cognizance of the contrast existing between the river systems of North and South America. In South America the heaviest rainfall takes place in that section which offers the broadest catch-basin, or drainage area, and this area lies in the heart of the continent, remote from the sea. In North America the division of greatest rainfall is of contracted area and lies close to the sea. This physical contrast lifts South American waterways into the position of great arteries of trade—commercial highways to the sea from centers of trade and population a thousand miles inland and often inaccessible to railroads.

The Argentine Republic has an area of 1,129,400 square miles, or about one-third the area of Brazil; it is four times the size of its western neighbor, Chile; twice the size of Bolivia, on the north; nine and a half times that of Paraguay, and fifteen and a half times that of Uruguay, both lying to the east. If transferred to the Northern Continent, this Argentine area would cover the Pacific coast territory from the Canadian line to the southern extremity of Mexico, including the states of Washington, Oregon, and California and all the states of Mexico. It could be divided into twenty-five states, each as large as Pennsylvania. From north to south it measures about 2,200 miles, or a distance exceeding that separating New York and Denver. In the northern part, or that nearest the Equator, the country has a width of 1,000 miles, equivalent to the distance between New York and St Louis; at the extreme southern limit of continental Argentine, however, the eastern and western boundaries are only 200 miles apart. Its coast line is equal in length to a line drawn from Key West, Florida, to Halifax, Nova Scotia. The wide range of climatic conditions prevailing in the Republic is indicated by the circumstance that its territory stretches over as many degrees of latitude as separate, on the Northern Continent, the most southerly point of Florida and the center of Hudsons Bay.

THE NATURAL DIVISIONS OF THE REPUBLIC

Although the larger portion of the Argentine Republic is popularly described as "the plains," the country

falls naturally into three great latitudinal divisions, each possessing marked characteristics of conformation and individuality of vegetation. The division of greatest importance and area is that bearing the name of the "Pampas" and occupying the central section of the Republic. From an elevation of about 2,000 feet in the foot-hills of the Andes the pampas sweep eastward to sea-level at the Atlantic. For the greater part they are treeless and covered with a growth of coarse grass which improves rapidly under grazing. The soil in most sections is rich alluvium, often from three to six feet in thickness, formed by decaying vegetation. This soil rests upon sedimentary deposits of earth scoured from the Andes and adjacent highlands. On these great pampas, or prairies, are pastured the majority of the cattle and sheep for which the Argentine Republic is famous, while districts under cultivation now produce more than half of the corn raised in the Republic.

The second division, which occupies the northern third of the Republic, passes under the general title of the river basin of the Parana. Here immense tracts of country, similar to the southern pampas, are devoted to the raising of wheat and the pasturage of cattle, while the fertile banks of the Parana and the Paraguay rivers are the scene of extensive agricultural colonization. Still farther north lie the sugar lands and the sections rich in timber. The soil of the river-basin country is sedimentary deposit of unusual breadth and depth, for the rivers have so frequently shifted their course that the deposit covers an area of 750 miles long and 400 miles wide, ranging from 30 to 100 feet in depth.

The third natural division of the country comprises the Patagonian plains, which form the southern portion of the Republic. These great plains of gravel and sand once formed a bed of an ocean which rolled against the Andes; they require irrigation to become productive. A number of small valleys of extreme fertility exist, however, in this division. Four salt lakes situated in this section are of commercial value.

While the country justifies the general description of a country of great plains, within its limits are to be found the highest mountains in the Southern Hemisphere, conspicuous among them being the giant uplifts of Aconcagua, 22,860 feet, the highest point in America.

LA PLATA—THE SECOND RIVER SYSTEM OF THE WORLD

The second largest river system in the world finds its way to the sea near Buenos Aires, capital of the Argentine Republic, bringing to that port commercial tribute from 10,000 miles of inland waterways—rivers which, ultimately consolidating in La Plata, discharge into the Atlantic a volume of water 84 per cent greater than that discharged into the Gulf of Mexico by the Mississippi River. This vast river system is almost wholly the gift of neighboring states, the volume of water in the greatest river of the system being as large where it enters Argentine territory, 825 miles inland, as at the river mouth, loss by evaporation equaling gain from intervening streams. The circumstance that these rivers are full-grown when they first cross the boundary line of the Republic—due to the equatorial drainage area having an annual rainfall of 60 inches—renders them of large commercial value. On the Parana, for example, vessels drawing 21 feet can reach the port of Rosario, 230 miles from Buenos Aires; vessels drawing 19 feet, Santa Fé, 350 miles; those drawing 15 feet, Corrientes, 850 miles, while craft drawing 8 feet navigate affluents of the Parana to points in Brazil distant over 2,000 miles from Buenos Aires.

BUENOS AIRES

Buenos Aires, capital of the Argentine Republic, with a population on September 30, 1902, of 861,513 and an

area of 72 square miles, is the largest and most important city of South America, the largest city in the Southern Hemisphere, and the second largest city of the Latin race in the world. Measured by foreign trade standards, it ranks second among American cities, its outward and inward tonnage being more than half the size of that credited to New York and four times as great as the tonnage of San Francisco. Liverpool, a representative old-world shipping center, ranks below Buenos Aires in area and population, and its tonnage is only 50 per cent greater than that of the Argentine capital. As regards situation, Buenos Aires lies as far south of the Equator as Norfolk is north of the Equator. It is distant from New York 5,868 miles; from Liverpool, 6,154 miles; from Hamburg, 6,500 miles; from Cape Town, South Africa, 5,218 miles; from Sydney, New South Wales, 6,300 miles, the last two cities named being on the same parallel of latitude with Buenos Aires. The city spreads over a level plain situated on the right bank of the great La Plata Estuary, 150 miles back from the sea and 125 miles west of the city of Montevideo, Uruguay, which lies on the northern side of the same estuary. It extends 11¼ miles from north to south and 15½ miles from east to west, with a circumference exceeding 38 miles. The low-lying character of the city's situation, which ranges from 15 to 50 feet above sea-level, combined with the shallow and shifting character of the channel of La Plata, has forced the construction of extensive and enormously expensive harbor works; these works now provide facilities for handling shipping in excess of 20,000,000 tons a year.

Buenos Aires is the commercial as well as the political center of the Argentine Republic, being the gateway and primary market for the larger portion of the trade of the Republic. Although the largest Spanish-speaking city in the world—double the size of Madrid—almost every language is spoken within its limits, four-fifths of its citizens being of foreign birth. Italians are more numerous than natives and there are 100,000 Spaniards resident within the city. Eighty per cent of the immigrants to the Argentine Republic come to Buenos Aires and it is the permanent home of 18 per cent of the population of the country.

THE ANNUAL HARVEST

Taking agriculture, one of the great industries of the country, as an illustration, we find the total area under crop to be only 17,464,958 acres. This is one-twentieth of the area available for crops. Indeed, it is estimated that in the provinces of Santa Fé, Corrientes, Cordoba, and Buenos Aires alone there exist over 157,000,000 acres of land capable of growing fine crops of wheat without artificial watering. From an area one-quarter the size of this, the United States now raises one-fifth of the world's wheat supply. To rightly measure, then, Argentine probabilities in the matter of agricultural development, we are thrown back upon the development already existing in certain provinces where wealth and energy have concentrated. Following this line of investigation, we discover that the Province of Buenos Aires, with an area of 69,000,000 acres, about two-thirds as large as California, in 1901 had 1,974,404 acres under wheat, producing 27,996,288 bushels; 1,683,287 acres under corn, producing 51,690,298 bushels; 259,390 acres under linseed, producing 3,650,968 bushels; 27,529 acres under oats, producing 577,654 bushels; 7,286 acres under barley, producing 66,782 bushels. This same province carried 52,630,451 sheep, 7,745,896 cattle, 1,675,385 horses, 248,720 pigs, 11,955 goats, 10,273 asses and mules. Within the limits of this one province, including the capital city, Buenos Aires, there were located, when the census of 1895 was taken, 14,000 manufacturing establishments, employing a capital of

$65,000,000, with 97,000 employees and 1,560 separate pieces of machinery, and yet this small section of the Republic, with its large agricultural, pastoral, and manufacturing development, contained a population of only 2,000,000, or less than one-third the population of Pennsylvania.

THE FALLS OF IGUAZU

By Marie Robinson Wright

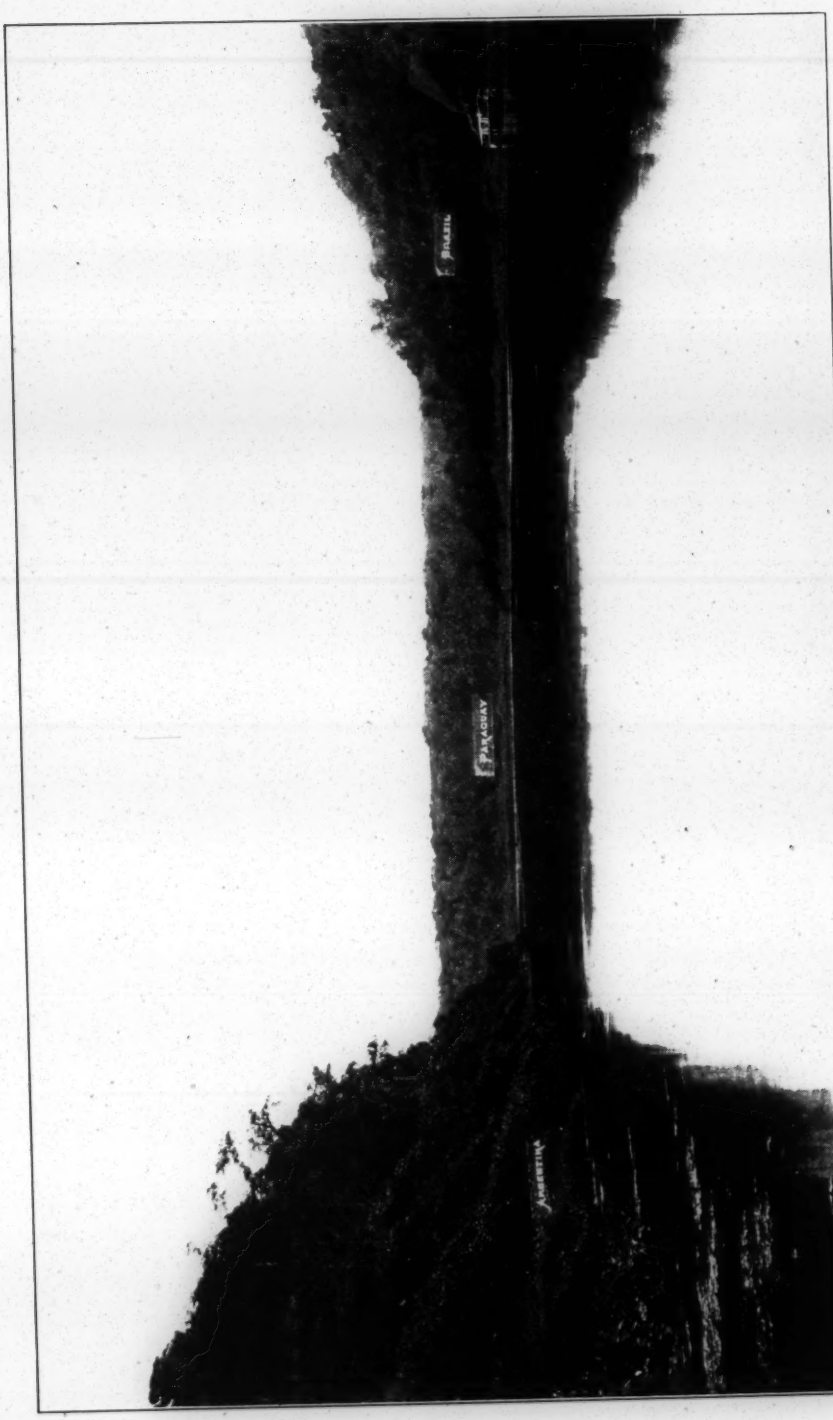
Author of "The Republic of Chile," "The New Brazil," "Picturesque Mexico," etc.

In the heart of South America, at the meeting place of three republics, Brazil, Argentina, and Paraguay, Nature has chosen the site for a masterpiece of scenic grandeur, to be compared only to the mighty Niagara in majesty, and pronounced by some of the few travelers who have seen it to be even greater than its North American counterpart.

The Falls of Iguazu occur at the junction of Iguazu River with the Upper Parana, in a territory famous as the original locality of the Jesuit missions, established in the sixteenth century, the ruins of which may still be seen by those who visit the falls. The history of these missions alone makes them sufficiently interesting to warrant a journey thither, and the fact that they have survived centuries of disaster from fire and storm speaks volumes for the enduring character of the work done by the simple natives of what was then a savage country, under the civilizing influence of the celebrated Company of Jesus.

There is no other spot in South America, except the site of the ancient empire of the Incas, where historic interest and natural beauty are so allied in attractiveness as in the land of "Las Misiones," where it overlooks the Iguazu Falls on the Upper Parana. In the course of the Upper Parana there are many notable waterfalls, among them the Guayra and the Nacunday, of considerable fame, but none equal the magnificence of the Iguazu. Until recently the inaccessibility of this region prevented its being known to any but daring travelers, willing to bear the fatigue and discomfort of many days' journeys across the pampas and through the forest, under the blaze of a tropical sun and subject to the annoyance of innumerable insects, with no accommodations along the route, nor at the end of it, except such as the traveler himself could provide. But now that the Argentine government has recognized the importance of opening up a route to the missions and the falls, regular excursions take many visitors to Iguazu from Buenos Aires and other Argentine cities. The return trip requires about two weeks, and can be made with comparative comfort by train to Posadas, on the Upper Parana, and thence by a small steamer in a few hours to the falls. Occasional excursions are also made all the way from Buenos Aires to the falls by steamer. The approach to the falls is heralded by the thunder of the cataract, which may be heard many miles away. About twelve miles above the falls the River Iguazu makes a sharp bend, almost at right angles, giving them greater extent and more varied character than those of Niagara, which to some degree they resemble. Indeed, a comparison between the two affords the best means of judging of their relative claims to preëminence, and is, perhaps, necessary in order to give an adequate idea of the appearance of Iguazu.

The cataract of Niagara makes a clear leap in an enormous sheet of water



The River Iguazu, where Three Republics Meet

General View of the Falls of Iguazu, from the Brazilian Side of River

twenty feet thick over a precipice varying from 150 to 180 feet in height. Above the falls is a broad expanse of river, and below them a narrow gorge through which the water is forced in a rapid torrent. The setting of this magnificent chef d'œuvre of Nature is a cluster of busy modern towns, with only the intervening parks to put them in harmony with the glorious work they serve to frame.

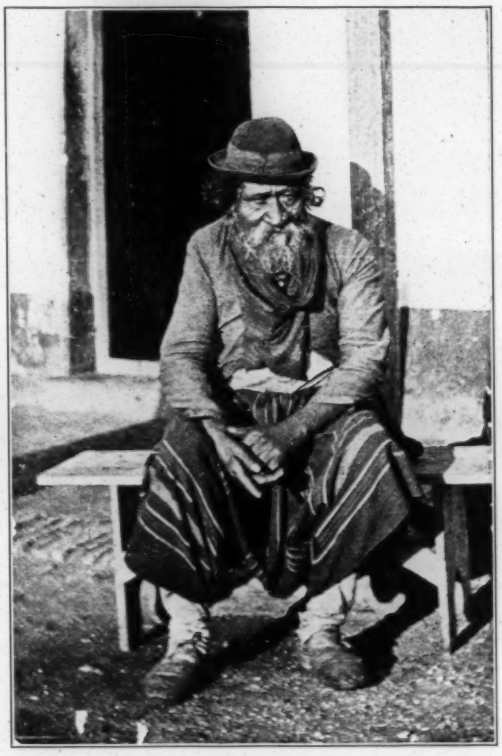
The Falls of Iguazu offer a notable contrast to Niagara in many important features. As the river makes the sharp bend already mentioned, the main volume of water rushes round the inner bank and is discharged into a long, narrow gorge, at one point making a clear plunge of 210 feet. Not all the volume of the river is received at this place, however, the rest of the water running out past it into the wide elbow formed by the bend, and circling along the further shore among many rocks and islands before reaching the edge of the cliff, over which the descent is made in two great leaps of a hundred feet each, in a vast semicircle of 3,000 feet. The total length of Iguazu Falls, if measured at the upper edge of the cliff, through their broken contour, including intersecting islets, is twice as great as that of Niagara, including the intersection of Goat Island.

The double fall of Iguazu is the most striking feature of the cataract, the rocky shelf or platform that divides the leap being in some places over fifty yards wide and in others only a few feet.

The scenery surrounding Iguazu Falls is in peculiar harmony with the solemn grandeur of the cataract and its varied character. The roar of the waterfall is more impressive for the solitude of the spot and the eternal silence that reigns in the dense forests that mark its border, into which the white man has scarcely penetrated. For several miles before the falls are reached, the river is a mass of huge frowning boulders and whirlpools, and the first view of the great cataract is often a disappointment, from the fact that it must be seen from many different points to be appreciated in all its beauty.

The outline of Iguazu Falls is so broken that one can hardly gain a correct idea of its immense width, and even the great height of the cataract loses something in effectiveness by being divided into two leaps instead of forming one stupendous fall. But, on the other hand, the charm of the South American falls as they plunge out of the hidden recesses of a semi-tropical forest at a hundred different points is unequaled elsewhere, and the traveler may look in vain the world over for a rival to their seductive beauty. Here Nature revels in perfect abandon and presents a spectacle seldom seen in these days, when the surging tide of travel rolls in upon her most secluded retreats with its "modern improvements." Iguazu remains so free from the meddling of man that one can imagine the picture to be much the same today as when it first came from the Creator's hand in the primeval days "when the morning stars sang together."

From the falls to the ruins of the Jesuit missions the route is along forest paths overgrown with tropical verdure. In the heart of a thick wood, covering more than a thousand acres, the ruins of San Ignacio, so named for the founder of the order, stand in persistent survival of all the agents of destruction that have attacked it during the past two centuries. A proof of the remarkable fertility of this region in which the Jesuits established their settlement is shown in the marvelous growth of the forest which now marks the site, most of the trees towering to a height of more than a hundred feet, although it is only about eighty years since the Jesuit capital was burned down. The only open space in this wilderness of woods is in the center of what was formerly the settlement—a public plaza around which the houses were built—and strangely enough no trees have grown on this spot, though they have pushed their way through crevices in the walls that mark where the houses stood and have buried under their branches the greater part of the ruins. Occupying all one side of the plaza was the church and the ruins

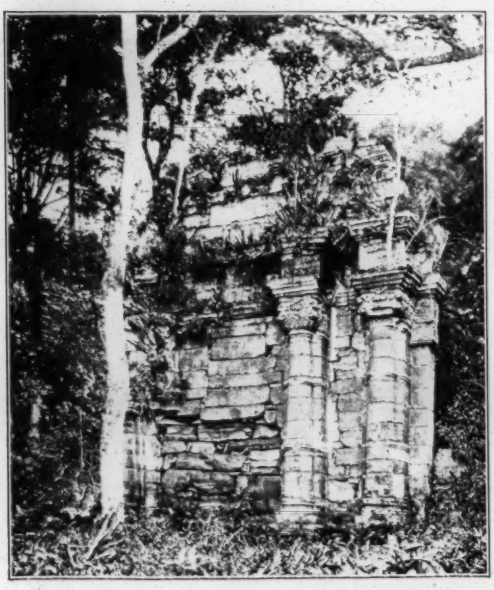


An Old Timer

of this edifice present many interesting features. The coat of arms of the Jesuit order are still in evidence, as well as some of the sculptured figures of the portico. The dimensions of this building were about 250 feet long by 150 feet broad. Behind the church was the college, with eight large class-rooms, and near it the refectory and cellars.

All the work of the missions was performed by the Indians, under the direction of the Jesuit fathers, and not only the churches but the dwellings of the Indians themselves were so well built by them that the ruins of these houses are as well preserved as those of the temples. Each house was 17 feet long by 14 feet wide and had a window and a door in front and a door at the back leading to the garden. In each house was a niche, presumably for the statue of some saint.

It is impossible not to admire the



San Ignacio. The Front Portico

genius of Loyola's followers, who were able to teach the arts of civilization to the savage so successfully that after more than three hundred years the record of their work remains to attest its strength and beauty. There still exist the evidences of good architecture, and creditable sculpture; and though, as is well known, the Jesuit edifices all over the country are remarkable for a lack of technical accuracy in their architectural design, yet they stand a great monument to the persistent energy of the most important civilizing agency in South America for two centuries after the discovery, and they represent an influence that extended from the Amazon to Cape Horn, of which proofs are to be found among the remotest tribes of the interior of the continent, who still preserve in the traditions of their people many of the Christian teachings brought to them by the Jesuits.

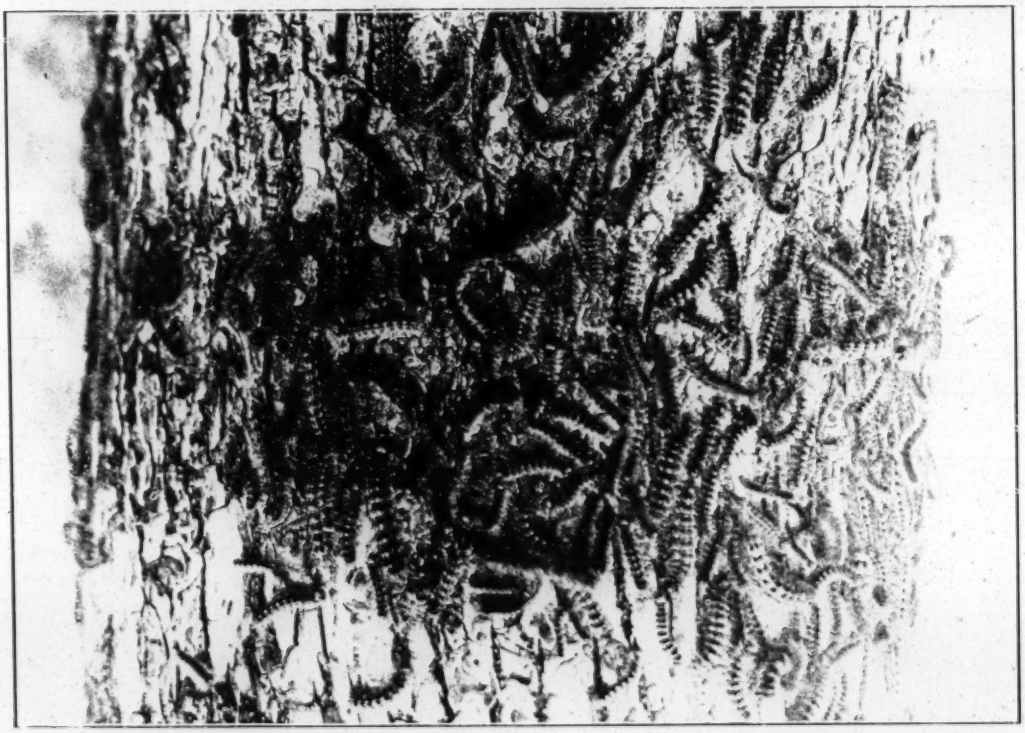


Photo from A. H. Kirkland

Gypsy Moth Caterpillars Beneath Burlap

Malden, Mass., July 12, 1905

THE GYPSY MOTH

SOME years ago a gentleman of Massachusetts, who was of an experimental frame of mind, imported some gypsy moths from Europe, in the hope of being able to cross them with the silk worm, and thus obtain a type of silk worm sufficiently hardy to stand the Massachusetts climate. Unfortunately his experiment failed, and some of the gypsy moths escaped. In the course of time they spread until they became known as the gypsy moth pest of

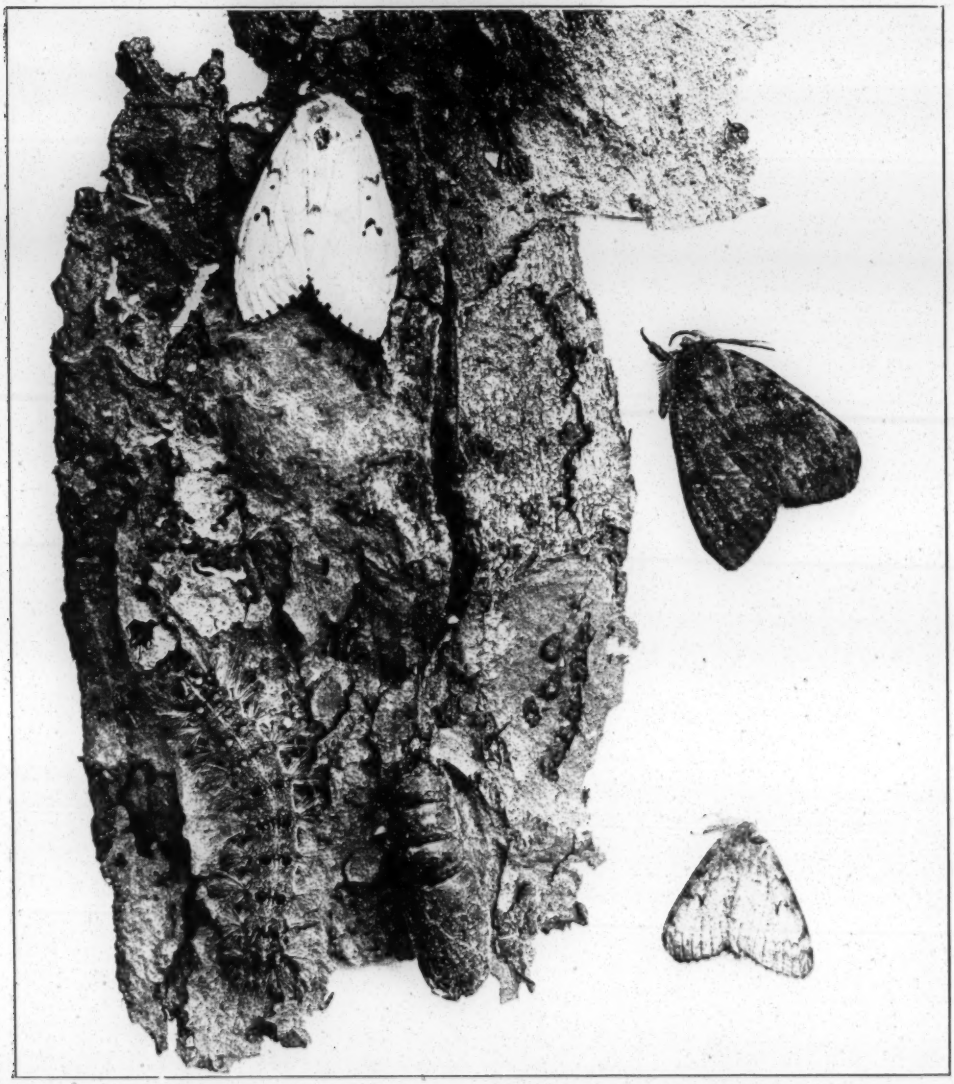


Photo from A. H. Kirkland

Various Forms of the Gypsy Moth

Female moth (white) laying eggs. Male moth (brown). Pupa. Larva

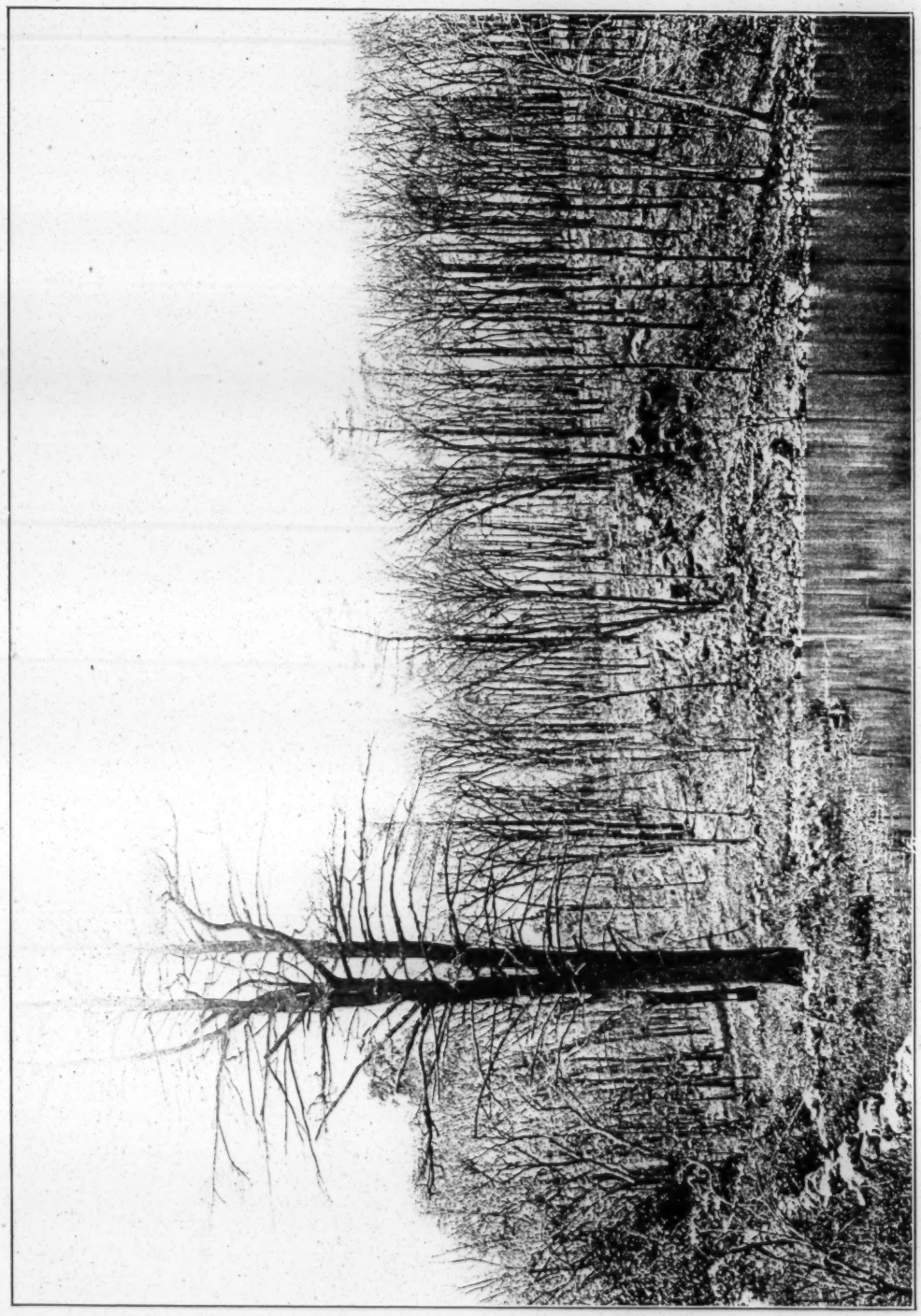


Photo from A. H. Kirkland

Woodland Stripped by Gypsy Moths

Menotomy Rocks Park, Arlington, Mass., June 30, 1905

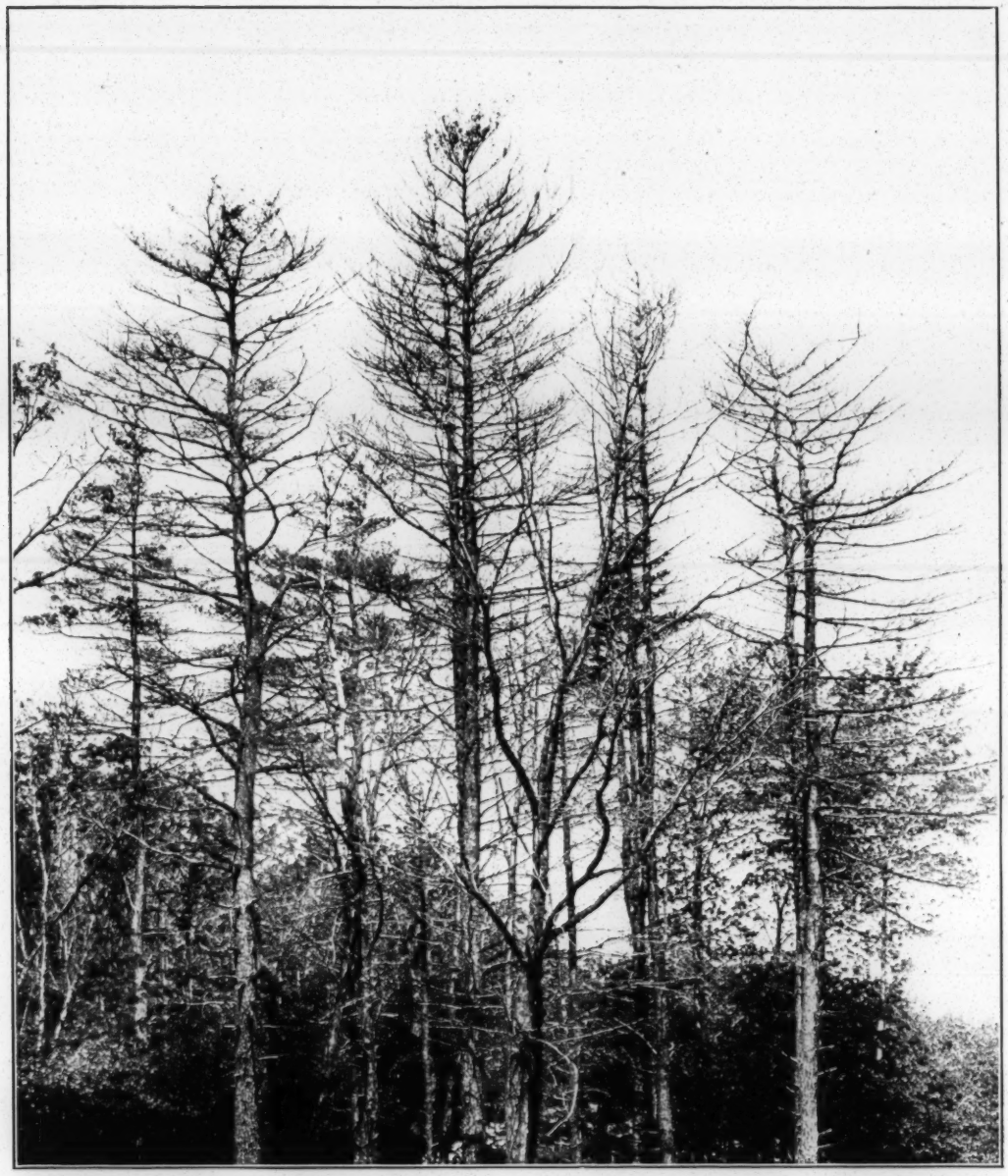


Photo from A. H. Kirkland

Dead Pines. Stripped by Gypsy Moth

eastern Massachusetts. Another destructive moth, the brown-tail moth, obtained an entrance several years later, concealed in a shipment of roses from Holland.

The State of Massachusetts has spent about $1,000,000 trying to check the ravages of these two moths. At one time it had them pretty well under control, but

Photo from A. H. Kirkland

Female Brown-tail Moths Laying Eggs on Cherry

Reading, Mass., July 17, 1905

the omission of an appropriation for several years enabled them to spread again, and the last several years they have been more destructive than ever. Recently it was recognized that some method in addition to destroying the nests and caterpillars must be devised to exterminate the moths, and a parasitic enemy of the moths has consequently been imported from Europe.

The gypsy moth is seen in many sections of Europe, but its ravages are comparatively mild because of the existence of a four-winged fly which lays its eggs in the gypsy moth caterpillar. To secure this, fly-infected caterpillars are imported. The United States Department of Agriculture, acting in coöperation with the gypsy moth service of the State of Massachusetts, has organized a service in Europe whose business it is to collect the gypsy and brown-tail nests and ship them to America. During the past season 116,000 moth nests were imported into this country. These nests were kept in sealed cages until the caterpillars developed, and the expert knew what was to come out of the nest. Each caterpillar was then carefully examined, and all caterpillars found to be free of the parasite were destroyed, whereas the caterpillars that contained the parasite were distributed in those parts of Massachusetts where the gypsy moth is most prevalent. As each nest contained about 250 caterpillars, the work involved the examination of over 25,000,000 caterpillars, and of these one-half of one per cent, or about 100,000, were found to contain the parasite. (It is interesting to note that many caterpillars contained parasites other than the desired variety; 52 different species of parasites were in fact discovered and destroyed.) The parasite fly breeds much more rapidly than the moth, two to three weeks being sufficient for its full development. The work of introducing the caterpillars is under the direction of Dr L. O. Howard, Entomologist of the Department, who is acting in coöperation with Dr A. H. Kirkland, Superintendent of the Gypsy Moth Service of Massachusetts.

THE SHATTERED OBELISK OF MONT PELÉE

By Prof. Angelo Heilprin

Author of "Mont Pelée and the Tragedy of Martinique," "The Tower of Pelée," etc.

Of the remarkable phenomena which enter into the history of the recent activities of Mont Pelée, and of the activities of volcanic mountains generally, few have attracted more wide-spread attention than the extrusion, through the Pelean apex, of a core of rock which, at the time of its greatest development, attained a height of upward of a thousand feet. This block of rock, which thus rose the better part of twice the height of the Washington Monument, in the city of Washington, and had a thickness at its base of from 300 to 500 feet, was a fundamental part of the history of the volcano for upward of a year, not improbably already existing in a minor or concealed form at the time of the destruction of Saint-Pierre, and continuing into the period of August to September of the year following (1903). Today nearly all that was of it lies in shattered fragments, covering up much of what before was the ancient crater basin of the Étang Sec and of the domed mass which has been constructed nearly centrally over the floor of this basin. The fragments of disruption occur in many sizes, from boulders of two to three feet diameter or less to others having the more respectable measure of ten, twenty, or even thirty feet. Their numbers make up a veritable wilderness of debris, from among which fumarolic vents are still at intervals forcing vapor, and in which at favored spots the eye detects small growths of fern and other lowly types of vegetation.

The generally active condition of the volcano, whether in its wilder or gentler mood, had until this year virtually barred all approach to this great rock monolith, and thus made its study a matter of inferential deduction rather than of actual observation. A long period of quiescence in the activities of Pelée has now made access to its central parts possible, and the riddle of the mountain is no longer kept to itself. Taking advantage of this condition of the volcano, the writer undertook a fourth journey to the island of Martinique in the month of February of this year, and, as he believes, successfully accomplished the object of his visit.

We arrived at Fort-de-France on the 21st of the month, five days after a fairly severe seismic movement, when the inhabitants of the capital city were still seeking refuge from possible earthquake visitations in short flights to the *campagne* and when Pelée was again coming in for a fair share of (wholly undeserved) excoriation. Despite cable reports to the contrary, the volcano was wholly passive—except for quiet emissions of summit steam—on the 16th, when Castries, on the island of Saint Lucia, suffered much, and Fort-de-France considerably less. A record of 35 to 40 houses more or less injured hardly has significance from the earthquake point of view, but it was sufficient at this time to point to graver possibilities or even probabilities in the near future, and hence *le volcan* and *les tremblements de terre* were an almost fixed topic of conversation with everybody. I made my accustomed pilgrimage to Saint-Pierre, now a disappearing ruin in an encroaching jungle, and on the second day following made my way over to the northeastern side of the island and established myself as heretofore, under the hospitable roof of the Usine Vivé. On February 27, starting from the Habitation Leyritz,

Photo by Prof. A. Heilprin

The Obelisk of Pelée

Photograph taken from the crater rim on June 13, 1903, looking north-northwest. The great puffs of steam issue from the contact zone between the obelisk and the "dome" (seen in the lower part of the picture), which envelops its base.

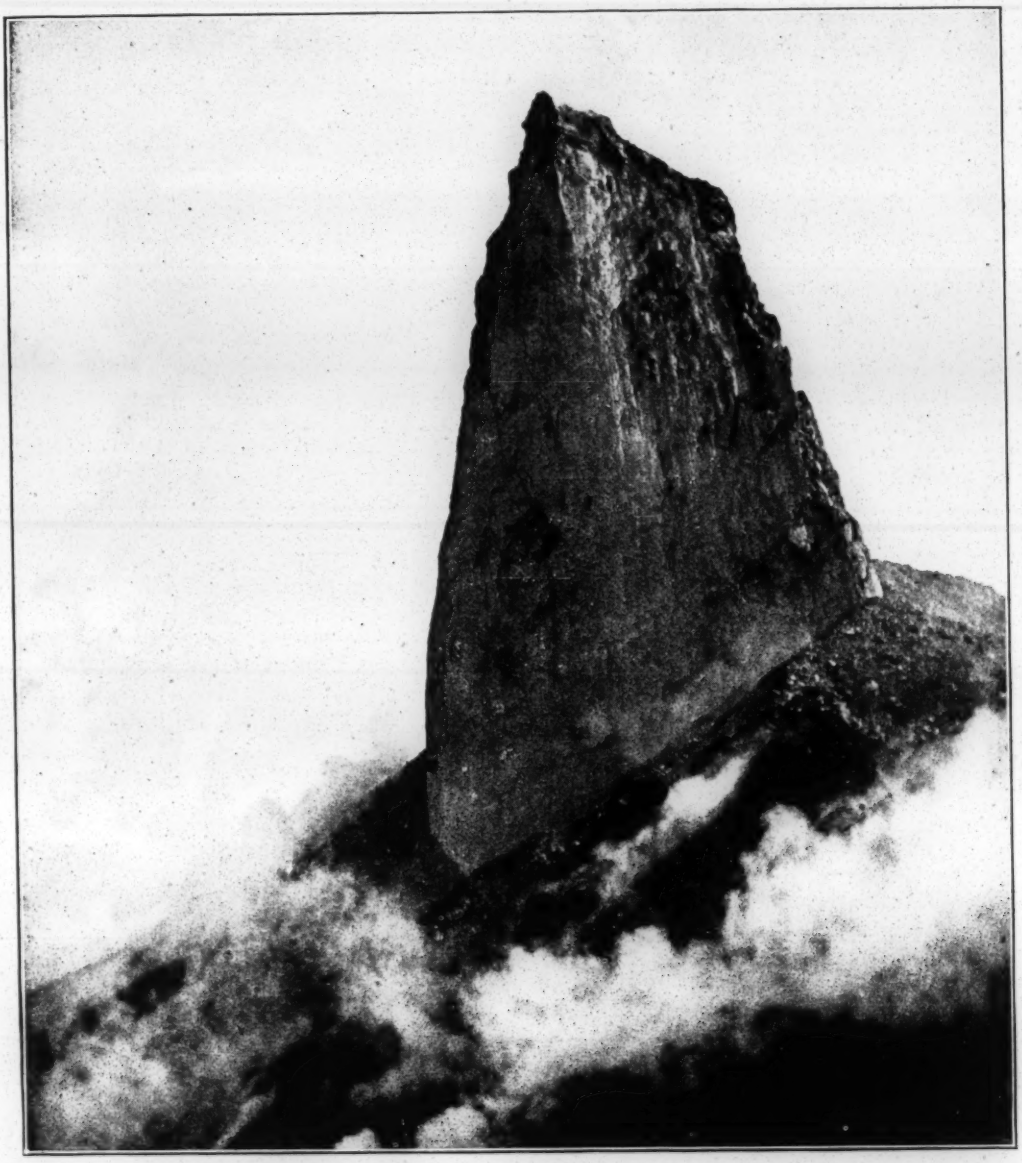


Photo by Prof. A. Heilprin

The Obelisk of Pelée

Photograph taken from the crater rim on June 13, 1903, looking approximately southwest. The obelisk passes sharply through its supporting dome. The smoothened surface, worn down by attrition against the wall of its enveloping chimney, is represented with a height of 840 feet.

when the tree-toads were still croaking and when Nature shrouded the landscape in a veil of darkness, M. des Grottes and myself, with two assisting carriers, bore off to the easy arête which steadily moves up to the summit of the volcano. A nasty rain, which came and went with intervals, dogged our trail for the better part of an hour and added little comfort to the little that goes with these trips. Once on the open slope of the volcano, however, everything went well, and my mount, the Arabian "Mocha," did its share of the journey in an unusually pleasant way, showing only scant signs of fatigue up to the point where conditions made it desirable to leave the animals. This is now considerably more than half way up the mountain.

We gained the summit, in a not particularly satisfying drizzle, shortly before eight o'clock, only to find that little was to be seen beyond. The crater basin was full of shifting clouds and vapors, and only in rarest snatches could we pick up through thinning areas the form of the massive dome and of its covering debris. At the spot where we reached the crater-wall, by some of the good people of the region facetiously called the *salon*, there were marked evidences of recent slipping and subsidence, and for some distance back of the border new separating lines told plainly of the reaches that before very long were to be added to the crateral hollow. A shift in the wind brought the greater part of the dome momentarily into view, and also cleared up what remains of the old Morne de la Croix. Its flank, a short distance from the brink, carries the new cross which in great state was planted on the 14th of September last. On this day Pelée was in gala form, for not less than six hundred inhabitants of the island formed part of the procession that followed the cross to the summit, moving up in a long continuous line that to some may have been reminiscent of the Chilkoot trail. A minor wooden cross has also been erected near the eastern border of what was formerly the basin of the Lac des Palmistes.

Following the rim of the crater along its northern face, or in the direction of the Petit Bonhomme, we found a spot where it seemed that a descent might be made over the very sharp knife-edge, and where, indeed, an earlier descent had already been made by my associate, together with two companions, MM. Salet and Beaufranc. A very stiff wind was unfortunately blowing over this crest, and for a time it seemed that its persistence would thwart our effort to gain the rim. My own affairs were not particularly encouraging either, for I had but one good foot, and dragged another as a reminiscence of a mishap on board the steamer of our voyage. Once over the rim, however, we were on fairly easy ground, and the scramble to the bottom was quickly made. Here we were immediately brought into contact with the parts of the obelisk, which were lying about everywhere, almost completely cloaking the body of the dome itself and measurably filling in the horseshoe-shaped area of the old crater basin. Close to the point of our descent the depth of the crateral cavity could hardly have reached a hundred feet. Westward of our position it was still less, while directly under the old Morne de la Croix it may have more nearly measured 150 to 200 feet. The dense vapors (in the absence of an aneroid) did not permit of any accurate determinations of depth at this time. The width of the hollow at its base had been reduced to hardly more than a rock-space in some places; elsewhere it widened out to a number of yards, and from its boulder-strewn surface steam was issuing in scattered jets.

Having secured the necessary footing, we almost immediately began the attack upon the dome itself, a sufficiently easy undertaking in the present condition of the volcano and requiring no care beyond that which attaches to

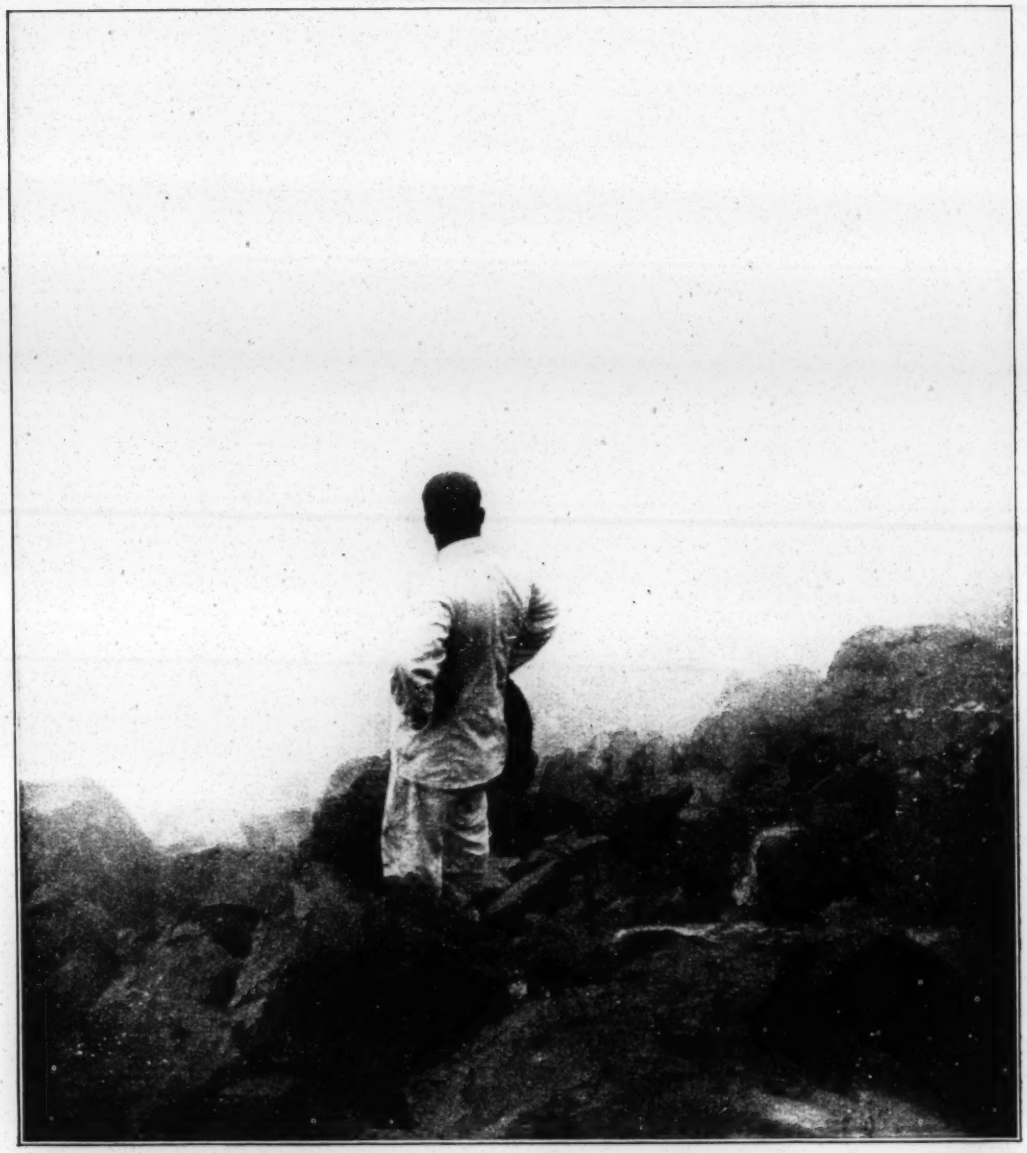
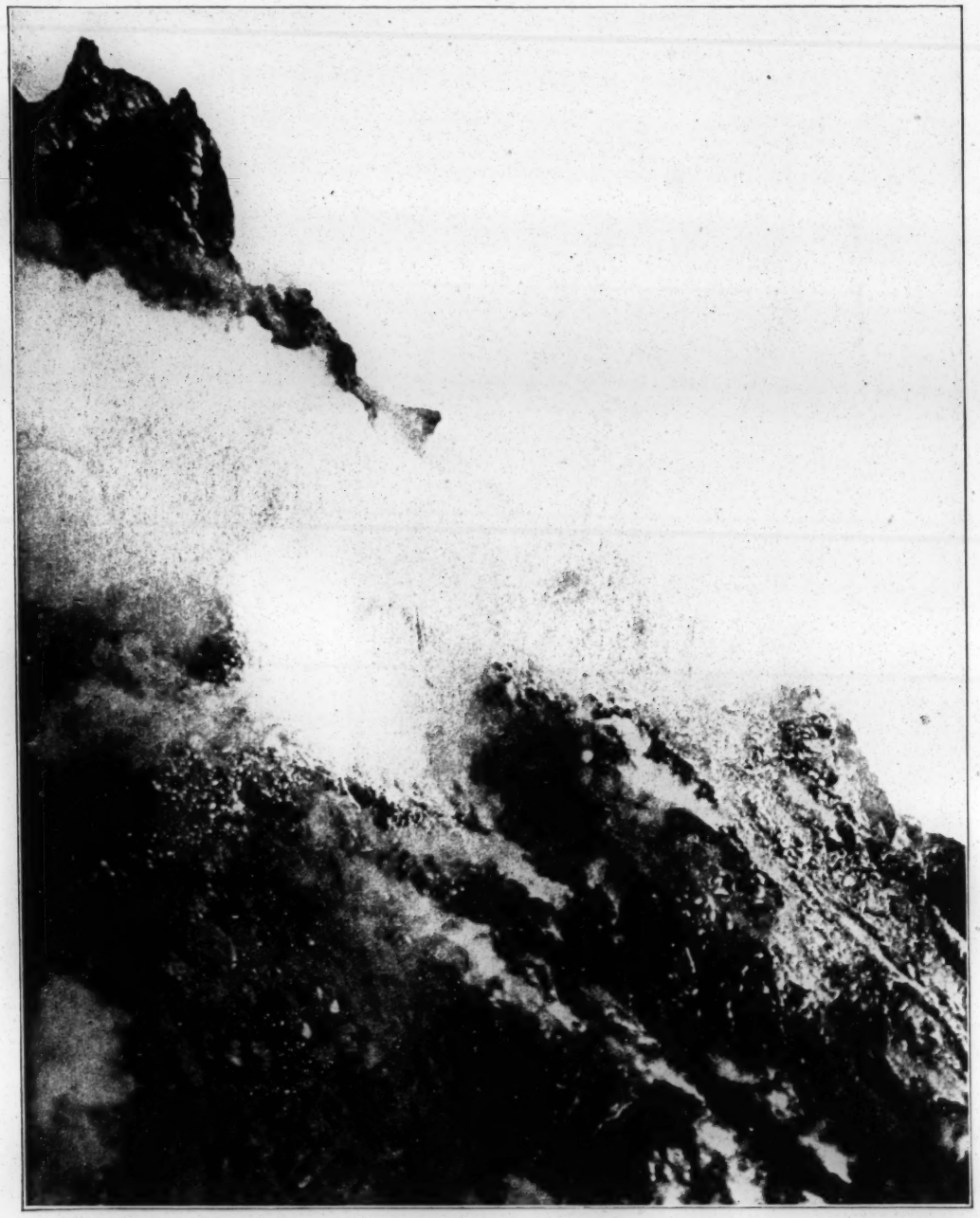


Photo by Prof. A. Heilprin

The Shattered Obelisk of Pelée

Photograph taken on the northeastern face of the dôme on February 27, 1906, looking out over the debris, which in small and large angular masses covers nearly the entire dome surface on this side. The rock is a compact hypersthene-andesite.



The Dome of Pelée

A portion of the dome on its eastern face, where it is in part built up by fluidal lava (June, 1904)

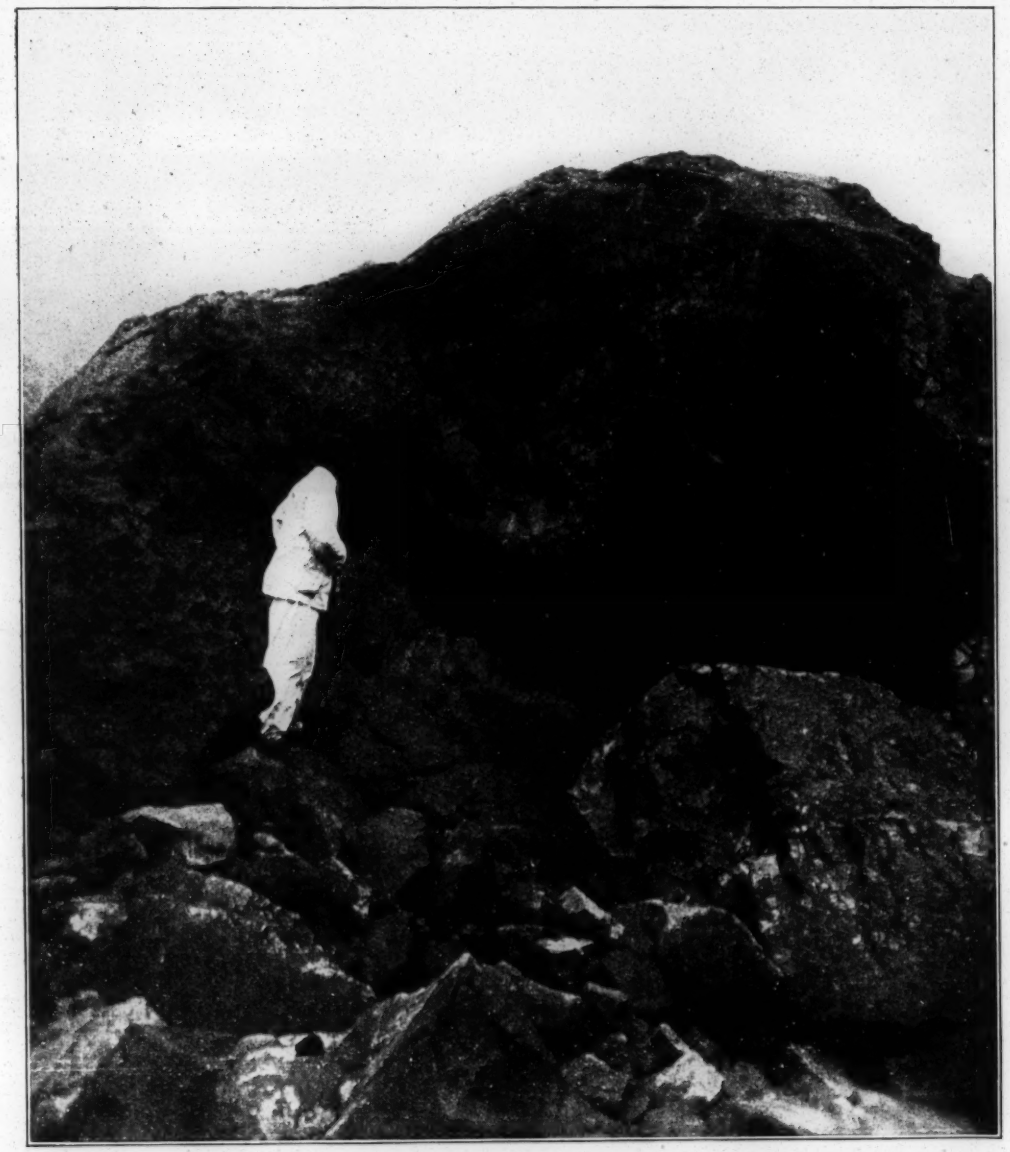


Photo by Prof. A. Heilprin

The Shattered Obelisk of Pelée

Giant blocks of hypersthene-andesite lying near the base of the dome in the surrounding *rainure*. Photograph taken on February 27, 1906, in the northeastern part of the old crateral basin.

the wise caution of looking where you walk. Loose boulders would be sent from time to time flying down the slope, giving out that peculiar sound, as of breaking glass and china-ware, which had already been noted by those who had made the early ascents to the crater rim, and as far back as the close of May, 1902. This "vitreous" or clinkery sound had been attributed by some—among whom I must class myself—to a possible vesicular or obsidian-like structure in the falling rock masses; but manifestly the condition was independent of this structure, for we found the rock to be everywhere of compact form, destitute of gaseous cavities, and nowhere even approximating obsidian in aspect or composition. Petrographically it is a light-gray, fine-grained hypersthene-andesite, of almost holocrystalline texture and differing but little from some of the older rocks of the volcano. It seemingly belongs to type IV of Lacroix's classification of the ejected products of Pelée (quartzitic andesites), although some give a faint indication of loose aggregation (approximating the rocks of type III ?), perhaps resulting from weathering, or, what seems to me more likely, the action upon the surface of superheated steam or other gases. As before remarked, we found no scoriaceous, clinkery, or vesicular masses of any kind, although it might be going too far to say that such do not exist buried up in the wilderness of material. At two points on the dome we came upon the extruded smoothened surfaces of the "ribbing" which forms part of the true structure of the dome itself, and found them to have virtually the same lithological characters as the boulder masses beneath which they were in greater part covered.

Having gained a point on the dome which, at times of clearing vapors, well overlooked the wall of the Morne de la Croix, and beyond which the further ascent is complicated by projecting pinnacles and a disagreeably steep gradient, we drew the line of our journey and turned our steps downward. Somewhat more caution was necessary in this descent than in the ascent, but without mishap the bottom of the *rainure* was found, and a slow, steady puli brought us again to the rim of the crater-wall. The wind was still blowing a semi-gale in this quarter and clouds hung heavily over the vertical summit of the volcano. Now and then the basal wreck of the great obelisk protruded its tooth-like form through the shifting vapors, giving to the mountain an aspect of savage ruggedness.

When before this visit I last stood on the crater rim the great obelisk of rock, like a veritable Tower of Babel, still rose 840 feet, a sheer precipice, above the summit of the dome which to-day bears merely a serrated crest. At that time, in the middle of 1903, the fires of the volcano were still burning, and steam and sulphur vapors were being puffed in great clouds through the mass of the dome itself, and through the zone of contact that united the dome with the gray and silent rock that rose out from it like a giant plug or cork. At that time, and from that time nearly to this, the geologist was still in doubt as to the precise characteristics of this singular volcanic excrescence—unique apparently in our world, but not unlikely duplicated in some of the tall objects, sending nearly straight shadows, which appear in some of the large crateral pits of the moon—but today we at least know what was its constructural rock material, even if a considerable doubt still attaches to the precise method of its formation.

The view that is seemingly most generally held by geologists as to the origin and construction of the Pelée tower is that which has been advanced, and so ably elaborated by Professor Lacroix, the chief of the scientific commission sent out by the Academy of Sciences of Paris to investigate the happenings on the island of Martinique. This view is, in its simplest

terms, that the giant rock mass represented a rapidly and recently cooled highly acidic lava, whose tension and viscosity were such as to permit of solidification at or about the time of extrusion; it belonged to the present period of eruption, and thus took the place of the free flows of lava which are ordinarily an accompaniment of the normal type of volcanic eruption. The pressure exerted on the ascending magma by the solidified dome which is thought to have closed over the central orifice is considered by Lacroix to have been an important factor in the production of solidification, even if not its absolute determinant.

While seemingly simple in its explanation, there are yet many difficulties in the way of the acceptance of Lacroix's hypothesis, and some of these I have pointed out, in advance of the publication of the monumental *La Montagne Pelée et ses Éruptions*, in my "Tower of Pelée." A few of these, to which others are added, are here enumerated:

1. The hypothesis of M. Lacroix compels a belief in the rapidity of the cooling and solidification of large lava masses which is seemingly at variance with all knowledge that we possess regarding the behavior of rock masses in fusion. The Pelée obelisk, although rifted much in the manner of the jointing of other rocks, was virtually solid to the core, and none of its decapitations disclosed moving fluid lava in the interior. We are thus forced to believe that a full cooling and solidification of the constructing lava mass had in an almost incredibly short space of time extended completely through the substance of the extruding part. At the time of its final disruption, in the early autumn of 1903, it is true that the basal scar was described as being a vast glowing brazier; but I should say that this condition was brought about by the forcing into the base of the monolith of some of the same lava which elsewhere was oozing out, and constructing, or helping to form, the supporting dome. Indeed, it may well be that the destruction of the obelisk was brought about largely by an "eating" into the mass of burning lava.

2. The hypothesis involves the assumption that the tower or obelisk was one of the later constructions associated with the awakening of the volcano, having been *preceded* in time by the construction of the dome, and its rise is dated back only to the middle of October (or November) of the year 1902. But, as has already been intimated, there are grounds for believing that it already existed within the chimney of the volcano as early as the fatal 8th of May, and its presence there as an obstructing "plug" may well have been responsible for the force and downward stroke of the destroying cloud that annihilated Saint-Pierre. There can hardly be a question that the scraggy and apparently cindery mass which I described in my earlier reports as defining a wall in the crater, and which is so well illustrated by Mr George Varian in the paper (*McClure's Magazine*, August, 1902) which details our ascent of the mountain on June 1, 1902, was the identical rock. While at Morne-Rouge on the day following (June 2), Père Marie assured me that three distinct tooth-like structures were plainly visible from the belfry of his cathedral, "looming up" above the crater's rim.

3. Professor Lacroix has pointed out, what seems to me to be in opposition to his own views, that the volcano had for several weeks maintained a condition of parallel (opposed) activity at the summit: the construction of a fluidal dome and the simultaneous erection of a rigid spine or tower. It would be difficult to explain this divergent condition on any theory of almost instantaneous cooling of outwelling lavas. One could hardly expect to find an outwelling mass so behaving as to lend itself to the formation, at or near the same place and under very nearly

similar conditions, of two structures which were so largely dissimilar in habit as the fluidal dome and the rigid spine. If the substance of the dome was able to maintain its fluidity, it might reasonably be argued that the mass of the obelisk would have been able to do the same. On the other hand the divergent condition is entirely consonant with any theory that holds that the extruded rock was an ancient rock core that had been bodily lifted from its moorings, and that it bore no relation in its making to the newer activities of Pelée. This is the view that I myself hold and is that which I have enunciated elsewhere. M. Lacroix has in many places pointed out that the mechanics of the two structures were independent of one another.

4. On the theory of a rapidly solidifying lava, one would naturally expect to find the surface of the cooling body giving out vapors from its inner parts, but the Pelée obelisk, except, perhaps, along lines of rifting or near its base, never, so far as I am aware, exhibited this peculiarity, the tower of rock looming up at all times grimly cold and dry, and with much the appearance of steam having acted upon its surface.

To the objections that have here been stated others less direct might also be urged. My recent journey has, perhaps, not contributed much to the elucidation of the subject, except in so far as negatively it has failed to determine, in an examination of much rock material, any evidences of recent solidification of the same. To this extent, therefore, it tends to support my contention, that the obelisk of Pelée was an ancient volcanic plug which bore no relation in its formation to the newer phase of eruption of the volcano, and was lifted bodily, as the result of extreme volcanic stress, in the manner of the great block of granite (and domite?) of the Puy Chopine, in the Auvergne.

WHAT THE LATIN AMERICAN REPUBLICS THINK OF THE PAN-AMERICAN CONFERENCES

THERE was recently held in Philadelphia, under the auspices of the American Academy of Social and Political Science, a special meeting devoted to the Pan-American Conferences, at which a number of notable addresses were given. The various speakers defined very clearly the significance of the conferences and the achievements of the two conferences that have already been held. Summaries of the speeches by the Mexican Ambassador, the Brazilian Ambassador, the Costa Rican Minister, and the Bolivian Minister, printed below, are interesting in that they give the Latin-American point of view.

BY THE MEXICAN AMBASSADOR, SENOR LICENCIADO DON JOAQUIN D. CASASUS

The Congress of the United States, by the act of May 24, 1888, authorized the President to invite the governments of Mexico, Central and South America, Haiti, and Santo Domingo to hold a conference in conjunction with the United States, with the object of discussing and recommending to the respective governments a plan of arbitration for the solution of conflicts that might arise between them; to treat besides on matters pertaining to the development of commercial traffic and of the means of direct trade between those countries,

and to improve the reciprocal commercial relations that might be beneficial for all. Never before had such an extensive program been presented for an international conference, nor had it been considered possible that such a program could be a matter of discussion between delegates of different nations.

The labors of the Pan-American Conference were of concord and peace; it had not the purpose, like the congresses of Leybach and Verona, to restore a form of government and authorize a nation to reconquer her colonies; nor was it inspired either as the Congress of Panama, a dream of the great Simon Bolivar, with the necessity of uniting the persecuted to resist the attacks of a common aggressor; but, seeking rather the union of all in a general effort, it undertook to create the general commercial prosperity of the hemisphere, giving this prosperity a basis of peace by means of the amicable solution of international conflicts.

The invitation of the Congress was addressed to all the governments of the American Continent on the 13th of July, 1888, and after all of them accepted it the Conference met at Washington on October 2, 1889, with James G. Blaine, then Secretary of State, in the chair. For a period of six months the program of the Conference was largely discussed, and its resolutions were in the form of simple recommendations to the respective governments.

The City of Mexico having been selected for the Second Conference, the government of the United States of Mexico, on the 15th of August, 1900, addressed an invitation to all the governments of the American states to assemble in October, 1901, in the capital of the aforesaid republic.

The program was as extensive as that of the First Conference, and was calculated to give rise to long and thorough discussion of all those principles that serve to lay the foundation of the agricultural, industrial, commercial, and political prosperity of America.

But the principal achievement of the Conference in Mexico, one which is destined to perpetuate its name in history, is the convention on obligatory arbitration of pecuniary claims, which, having been ratified by the Congress of the United States, by that of Mexico, and by Peru, will soon be also approved by all the other nations of this hemisphere.

To understand the wide scope of this convention it is sufficient to consider that, notwithstanding the gigantic efforts made in all the civilized world to renounce force to obtain redress, this is the first time the principle which the great Argentine jurist, Carlos Calvo, enunciated, that the collection of pecuniary claims should never be made by force, has been consecrated in a general and obligatory form.

It is not possible for human sagacity to penetrate the future, to ascertain what the next and the succeeding international American conferences are to be in the course of time, but it can be affirmed without fear of falling into error that each one will be of more importance than the preceding, and that all of them will strive with more eagerness to strengthen the bonds which are to unite the nations of this hemisphere.

If we have seen that a union of the nations is to be accomplished at the cost of some sacrifices of national selfishness, and if we have reflected that in the long run these sacrifices, without suppressing the frontiers which divide nations, contribute to the organization of future humanity, it is but natural to suppose that all of these conferences which America is to hold from time to time are to be landmarks in the way traversed until we reach the ideal that protects and encourages us. The American Continent, governed by free institutions, ruled by just governments, impelled by noble ambitions, is the most appropriate field for establishing the new forms of future international law, and we may hope that to the crea-

tion of these new forms the Pan-American conferences will direct all their efforts.

BY THE BRAZILIAN AMBASSADOR, MR JOAQUIM NABUCO

The function of these periodical assemblies of the American republics, as it appears to me, should be, first, to create and manifest to the world the American conscience; secondly, to form the American public opinion. I am employing the word American in the sense of continental.

The American conscience is the sentiment of our own separate orbit, absolutely detached from the European, in which Africa and Asia, not speaking of Australasia, are moving. With all our sympathy and interest for Europe, conscious of all we owe to European influx, products as we are of the overflow of the European races, doubting even that in our soil the stems of European culture could ever produce the same fruits or the same flowers as in their native soil, we, however, are a political system wholly unconnected with the orbit of Europe.

An obstacle to the growth of this Pan-American conscience lies in the great shadow your great country throws over the rest of the continent. But it will be a matter of good sense and of sincerity for the Latin republics to recognize a fact that the whole world is conscious of and frankly acknowledge the guarantee afforded to the separateness of the whole American system by the existence in its midst of a mass of human energy that practically balances the rest of the world.

SOUTH AMERICA BELIEVES IN THE MONROE DOCTRINE

For the formation of the American conscience it is necessary, therefore, that the Latin republics do not look to the part that the United States had and has to play in guarding the Monroe Doctrine as in any way offensive to the pride and dignity of any of them, but, on the contrary, as a privilege which all ought to support, at least with their sympathy and their gratitude. That will, no doubt, be the ultimate result of the Pan-American conference, as, working together with you, they all will understand better your aims, your sincerity, and your disinterestedness.

The other great function of these conferences is the formation of a common public opinion throughout the continent. You have seen in what words Secretary Root put it in an address he delivered the other evening at the Brazilian Embassy in Washington: "May we all do our share toward the building up of a sound and enlightened public opinion of the Americas, which shall everywhere, upon both continents, mightily promote the reign of peace, of order, and of justice in every American republic."

I am glad he expressed himself in that way, as I have always maintained that everything in that direction depends absolutely on the creation of a common American opinion.

The great laws of the physical world apply, we may be sure, to the moral world as well. You could not conceive a religion, an institution, a society, that would remain impenetrable to the spirit of the age, as that would be the same as imagining a body without porosity; neither can you imagine nations mixing and working together without showing in the length of time distinct traces of the civilization as liquids in communicating vases will show the same level. These conferences are the means of communication, until they become the communion of the American republic. They are bound to take one day the same level. Remember that Latin-America in these conferences is mixing with your democracy, the like of which, both in scope and magnitude has never before been seen in history. This American democracy is a great magnet for freedom, for progress, and for peace.

I will add one word more, since I am

at one of the centers of America's highest culture. What the conferences and meetings of the governments can do is much in itself, but it is little compared to what would be done if the people, the liberal minds, the institutions, the organs of public opinion of the different American republics, were to approach each other, to have their own conferences, to show real concern in their common progress, in seeing that no country remains hopelessly behind the others. That is the much broader and much deeper task that is waiting for the awakening of the universities of the two Americas, chiefly of yours, for a generation of masters and students possessed of the continental spirit and anxious to see American civilization expand and equally cover the whole New World.

BY THE COSTA RICAN MINISTER, SEÑOR DON JOAQUIN BERNARDO CALVO

Speaking for Central America and especially for my own country, I wish to say a word. That precious link between the two Americas to the blessings of being in the center of this continent, bathed by the two great oceans, inhabited by peoples of no common intelligence, orderly and progressive, adds to its glory one of which we are proud. The independence of Central America was the consequence of the triumphs of the great patriots of Mexico and South America, and was declared on the 15th of September, 1821, and only two years later, by a single decree, the abolition of slavery was accomplished at once, without any indemnity being paid to the owners of the slaves who were themselves the first to support this humane measure. Such an act shows how Central American people appreciated the benefits of liberty, which they owed to their greater neighbors, and that they were well enlightened for their new life as a free people.

To be relatively small is not a disgrace. Material grandeur, if certainly desirable, is not the acme of greatness, and we know that the latter exists where justice rules, where the general good is the supreme law, and where the aspiration is toward the consideration and respect of the other nations and toward the common advancement of humanity.

Now we are divided into five independent states, with Panama as a sixth, which may eventually merge into a greater nation. But, whether united or divided, the states of Central America have shown at all times their love for progress and advancement; they have coöperated with true ideas of Pan-Americanism to the success of the first and second conferences; therefore you are assured that they fully recognize the broad as well as narrow interests which the republics of America have in common, and will cheerfully now, as they have in the past, endeavor to do their part in the intelligent progress that the Third Conference is destined to bring about.

BY SEÑOR DON IGNACIO CALDERON, THE BOLIVIAN MINISTER

When a handful of pilgrims abandoned the home of their fathers for conscience sake, and undertook to cross the ocean, seeking their freedom, everything before them was uncertain, except their faith in God and their deep and strong love for justice and right.

They brought and propagated in the New World all the virtues that go to make a man a true and worthy image of his Maker; and from such seed have developed a nation that in due course of time has come to be, not only a great world power, but the sacred asylum for all liberty-loving people.

Great as is your material strength, astonishing as is your progress and the expansion of your industries and commerce, and amazing as is the accumulation of wealth and the well-being of the great majority of the people of the United States, nothing appeals with greater force to my mind than the prac-

tical working of the principles of equality and freedom, limited only by law, which fact I consider as the mainspring of all your advancement and power.

When I contemplate the humblest citizen enjoying all the privileges and having open to him all the honors and the rights that in some other nations are the patrimony of the few, I cannot help exclaim that American democracy is truly the consummation of the conquests of liberty and justice in the world.

Now, on the other hand, if you please, remember for a moment how different was the material that came to colonize and settle the other portions of the American continent. When you consider that the men who conquered Peru and Mexico were nothing but adventurers seeking for gold and the satisfaction of their hunger for wealth, that after vanquishing and destroying highly organized nations submitted their inhabitants to serfdom, that the history of the three centuries of Spanish dominion is only a long chain of despotism and tyranny, you readily understand that when the Latin-American republics, after many years of fighting for their freedom, succeeded at last and made themselves independent through their own exertions, their traditions and their education was far from suited for the proper exercise of free and orderly government.

That is why during the early times of their independence, and some of them even up to this day, had to pass through a dark period of formation and revolutions.

Fortunately the majority of the republics in that section that is really South America have entered firmly upon an era of peaceful development of their natural resources, under well-established governments.

Bolivia had also an epoch of misfortunes, and after sad experiences that cost her the loss of much of her territory is now earnestly seeking to develop her great wealth and future.

Her mineral resources are second to none, and the Bolivian mountains contain a wonderful variety of minerals. The silver mines of Potosi are famous in the history of the world, and have contributed a large share to its wealth.

Silver, copper, antimony, bismuth, gold, and at present tin are the principal of many minerals that her territory produces.

An Italian scientist, Mr Raymondi, who has devoted his whole life to the study of Peru, has called Bolivia "a silver table standing on legs of gold."

The Andes getting into Bolivian territory divide themselves into two big branches. One toward the coast forms the western Cordillera, and the other leading toward the interior and the east is called the Cordillera Real. Between these two branches extends the high plateau where most of that mineral wealth is to be found.

In the eastern section are vast plains, where wild cattle and horses roam, and the virgin forests, where rubber, Peruvian bark, and a great many other medicinal plants and all kinds of fine woods grow luxuriantly. The reason why in the commerce of the world a great many of these Bolivian products are not known as such is because on passing through neighboring republics' territory they are shipped from their ports, and hence the Bolivian copper, for instance, passing through Chilean ports is considered as Chilean copper. The Bolivian rubber shipped at Para is called Para rubber, etc.

My government is at present endeavoring to build a system of railways that will connect the north and the south of the country and facilitate the development of its resources. An idea of their importance may be had in knowing that in a few years, and notwithstanding the absolute lack of means of transportation, we have increased our exports of tin from about 2,000 tons of crude ore to 25,000 tons last year; and it is a remarkable fact that Bolivia is the only tin-producing

country in America; and as this metal is found almost all over the country, its future is great. The United States consumes for its industries about 43 per cent of the tin in the world, and for the want of banking facilities, direct transportation from South America here, and custom hindrances, you are compelled to get from Europe the Bolivian tin; and this is the case with many other South American products.

When the roads that are now being surveyed are completed one of the most important links of the Pan-American Railway will be made, and then it will be possible to go over a distance of about 2,000 miles, from La Paz in Bolivia to Buenos Aires in the Argentine, in a few days by rail.

A COUNTRY WITHOUT A DEBT

I will also mention the fact that Bolivia is absolutely free from any foreign debts, and instead of owing any money, has at her disposal $10,000,000 in gold devoted to the building of railways, and that her revenues are sufficient, not only for all the expenses of the administration, but to leave some surplus to pay the interest of the additional capital that we are seeking for the construction of the roads I spoke about.

We will welcome the rivalry of capital and the enterprising spirit of the Americans, and I earnestly hope that the leading men of this country will pay more attention to the great possibilities that are to be found in every one of the South American countries; and that coming in closer contact the peoples of the North and the South will learn to understand each other better, and to see that South America is not a field only for revolutions, but that her people are just as progressive and ready for advancement as any in the world. And by this means a true Pan-American feeling may be developed in a great democratic brotherhood based on the mutual respect and estimation of its citizens, and thus banish all feelings of mistrust and fear.

REASONS WHY THE UNITED STATES IN PARTICULAR SHOULD ENCOURAGE THE PAN-AMERICAN CONFERENCES

THE following paragraphs are quoted from testimony of Hon. Elihu Root, Secretary of State, before a committee of Congress, urging substantial support of the Conference at Rio de Janeiro.

I think that the work of the Bureau of American Republics, the existence of the International Union, and the holding of these conferences afford altogether the best means of breaking up the comparative isolation of this country from the other countries of America and establishing relations between us and them in place of the relations—the rather exclusive relations—that have existed hitherto between them and Europe.

Our relation with them has been largely a political relation, while, on the other hand, the ties of race and language and inherited customs and usage—the relations which have come from the investment of great amounts of European capital in their country, which have come from the establishment of numerous and convenient lines of communication between them and Europe—have made the whole trend of South American trade and social relations and personal relations subsist with Europe rather than with the United States; so that while we occupy the political attitude of warning Europe off the premises in Central and South America under the Monroe Doctrine, we are comparative strangers to them and the Europeans hold direct relations with them.

Now there is, I think, a strong and genuine desire on the part of the South American statesmen—and they have very many able ones—to promote a greater knowledge on the part of their people of the people of the United States, and on the part of our people a greater knowledge of the southern republics, and to promote greater inter-

course. Just at this time, of course, the great increase of capital in the United States is on the threshold of seeking investment abroad. We are about at the close of the period during which all our capital and all our energy were engrossed at home, and I can see in the State Department an enormous increase of business relations between Americans and other countries. They are going into construction work and are pushing their way, making banking transactions, and all over Central and South America capital is ready to go. I take it to be the proper function of government to help create situations of friendly relations and good understanding, which will make it possible for capital to go.

* * * It seemed to me that I could not do any more useful work to the country for the promotion of American trade interests and at the same time for the promotion of these relations which tend to maintain peace and harmony than to foster and advance this tendency which finds its expression through the Union of American republics and these successive conferences.

UNITED STATES DELEGATION TO RIO

The personnel of the board which will represent the United States at the Conference of the American Republics July 21, 1906, at Rio de Janeiro, Brazil, consists of the following: W. L. Buchanan, chairman of the Commission; Leo S. Rowe, of the University of Pennsylvania; Mr Larrinaga, Porto Rican Commissioner in Congress; Van Leer Polk, Tennessee; ex-Governor A. J. Montague, of Virginia; Paul S. Reinsch, of the University of Wisconsin, vice James S. Harlan, declined, and Charles R. Dean, of the State Department, secretary of the Commission. In addition to these the Bureau of the American Republics will be represented by its Director, Williams C. Fox.

GOOD BOOKS ON MEXICO, CENTRAL AND SOUTH AMERICA

"The South American Republics." Thomas Dawson. G. P. Putnam's Sons. 1902. 2 volumes. $1.35 each.

"A Commercial Traveller in South America," being the experiences and impressions of an American business man. Frank Wiborg. McClure, Phillips & Co. 1905. Illustrated. $1.00.

"Great Mountains and Forests of South America." Paul Fountain. Longmans, Green & Co. 1902. Illustrated. $4.00.

"Central and South America." Augustus Henry Kean. Lippincott. 1901. Maps and illustrations. 2 volumes. $5.50 each.

"Tropical America." Isaac N. Ford. Scribner. 1893. $2.00.

"Spanish American Republics." Theodore Child. Harper. 1891. $3.50.

"The Capitals of Spanish America." William E. Curtis. Harper. 1888. Illustrated. $3.50.

"Between the Andes and the Ocean." William E. Curtis. Fox, Duffield. 1903. $2.50.

"The Land of the Amazons." Translated from the French of Baron de Santa-Anna Nery by George Humphrey. G. P. Putnam & Co. 1901. Illustrations and maps. $4.00.

"Brazil, Amazons and the Coast." Herbert H. Smith. Scribner. 1879. $5.00.

"The New Brazil;" its resources and attractions. Marie Robinson Wright. George Barrie & Sons. 1901. Illustrated. $10.00.

"The Republic of Chile:" The growth, resources, and industrial conditions of a great nation. Marie Robinson Wright. George Barrie & Sons. 1904. $10.00.

"Panama to Patagonia." By Charles M. Pepper. With maps and illustrations. A. C. McClurg & Co. 1906. $2.50.

"The Colombian and Venezuelan Republics." By W. L. Scruggs. Little, Brown & Co. 1900. Illustrated. $1.38.

"Venezuela—A Land where it is Always Summer." By Wm. E. Curtis. Harper & Bros. 1896. Illustrated. $1.25.

"Mexico and the United States." Matias Romero. G. P. Putnam's Sons. 1898. Illustrated. $4.50.

"The Awakening of a Nation. Mexico of Today." Charles F. Lummis. 1898. Illustrated. $2.50.

"Two Bird-lovers in Mexico." C. William Beebe. Houghton, Mifflin & Co., 1905. Illustrated. $3.00.

"Unknown Mexico." Carl Lumholz. Scribner's Sons. 1902. 2 volumes. Illustrated. $12.00.

"In and Out of Central America." Frank Vincent. Appleton. 1890. Maps and illustrations. $2.00.

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